

**PROJECT DATA
FOR
PERIODIC INSPECTION**

**EDWARD MACDOWELL DAM
MERRIMACK RIVER BASIN
NUBANUSIT BROOK, NEW HAMPSHIRE**

AUGUST 1973

**DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.**

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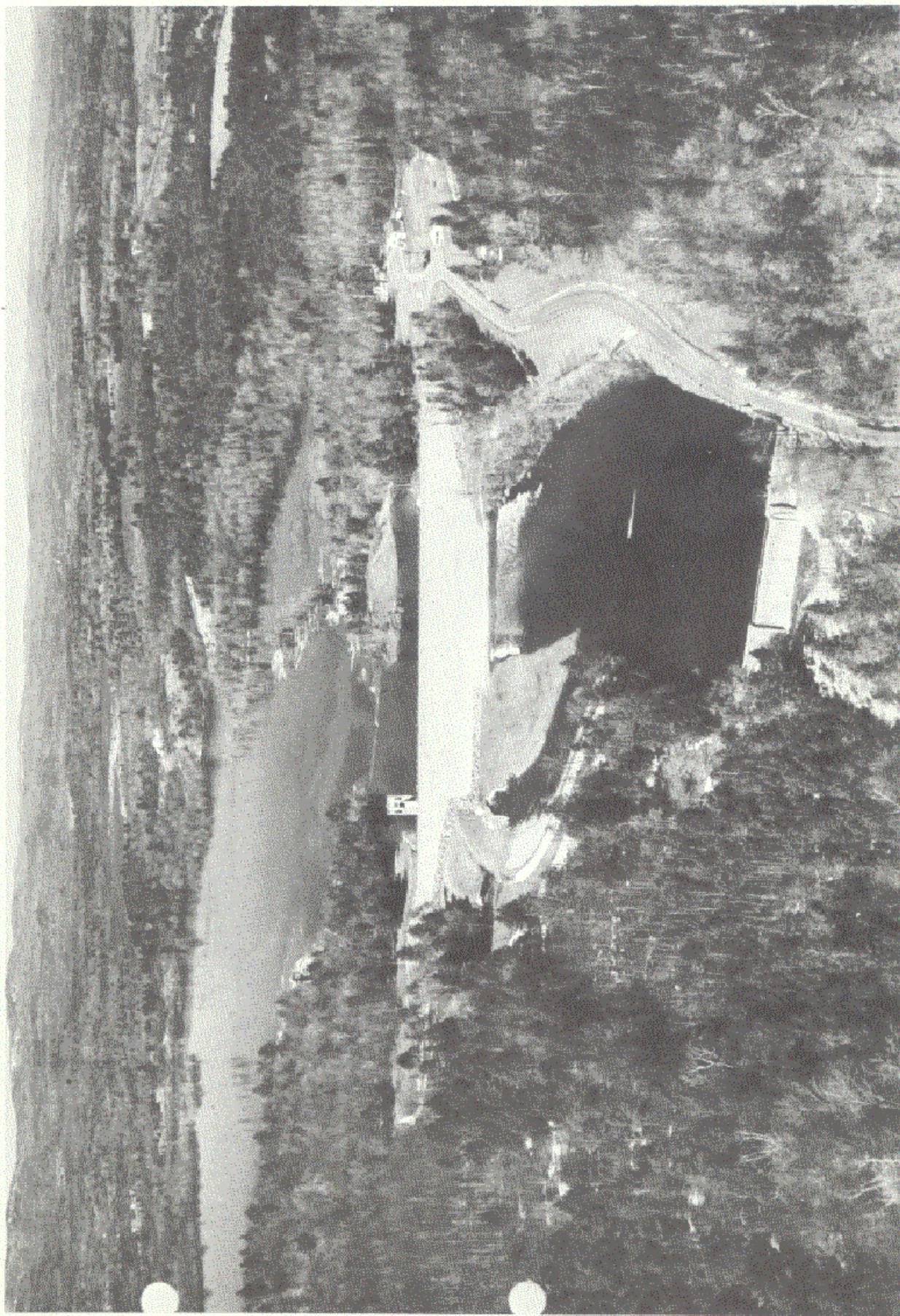
AUGUST 1973

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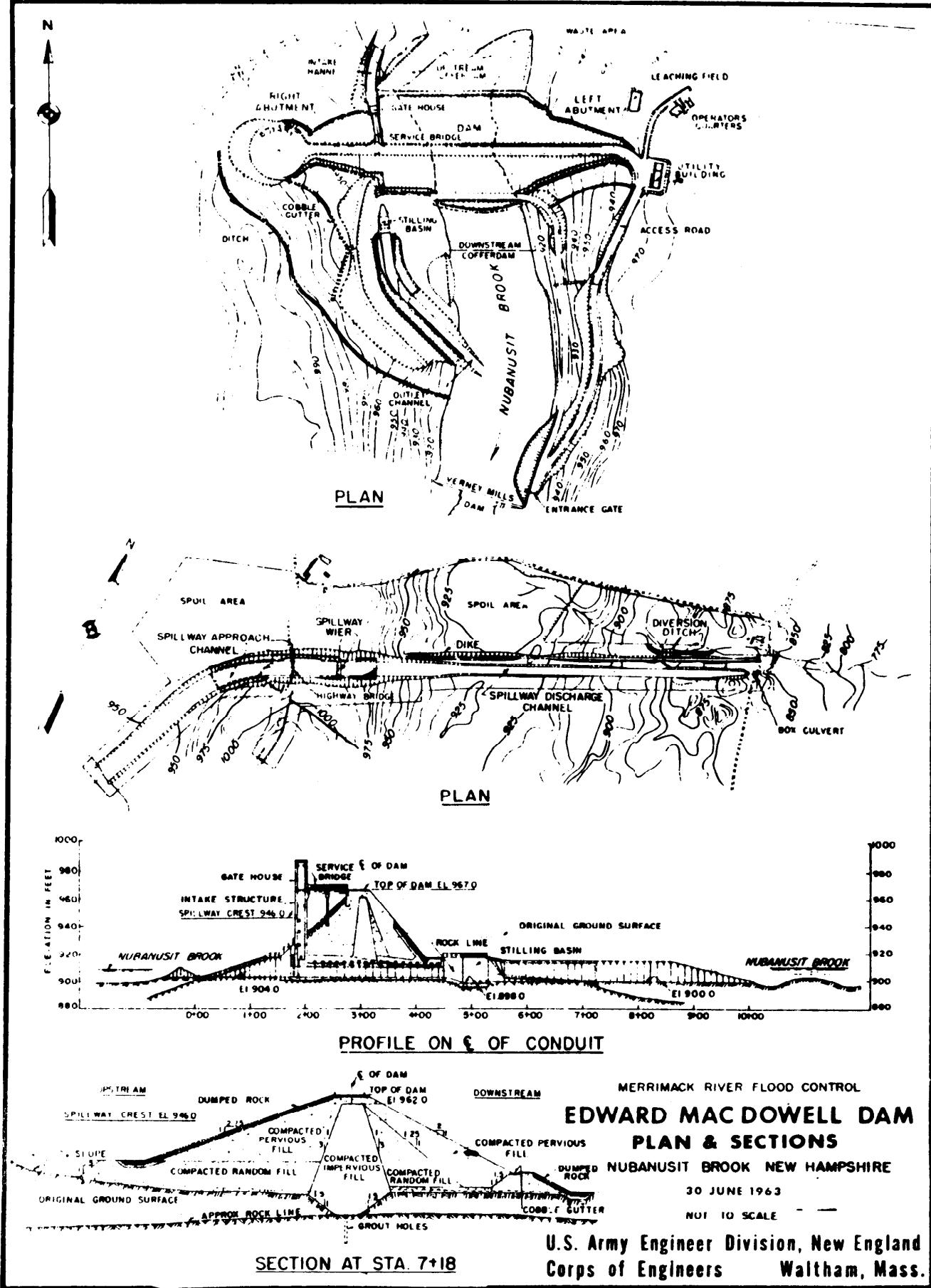
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EDWARD MACDOWELL DAM APRIL 1958



PERTINENT DATA

Location: Nabanusit Brook of the Contoocook River at West Peterborough,
New Hampshire

Drainage Area: 44 Square Miles

Dam

Type	Earth fill with rock slope protection
Length	1100 feet
Maximum height above streambed	67 feet
Slopes of embankment	
Upstream	1 on 2.75
Downstream	1 on 2.00
Top of dam elev.	967 feet m.s.l.
Top width	25 feet

Outlet Works

Service Gates

Type	Mechanically operated - Slide
Number and size	3 - 3'0"x7'-0"
Elevation of gate sills	904.0 m.s.l.

Spillway Weir

Type	Chute with ogee weir
Crest length	100'
Crest elevation	946'
Maximum spillway discharge	17,800 C.F.S.

Reservoir Data

	Elevation Ft. m.s.l.	Area Acres	Capacity Acre Feet	Run-off Inches
Conduit Invert	904.	-	-	-
Recreation Pool	904-912	180	300	0.12
Flood Control Storage	912-946	840	12500	5.5
Spillway Crest	946	842	12800	5.5
Maximum Surcharge	961			

PROJECT DESCRIPTION

EDWARD MacDOWELL DAM MERRIMACK RIVER BASIN NABANUSIT BROOK, NEW HAMPSHIRE

1. HISTORY.

a. Edward MacDowell Dam (originally designated as West Peterborough Dam) is one of a system of 5 dams and reservoirs which have been constructed in the Merrimack River Basin for flood control purposes. The operation of Edward MacDowell Dam and the other four reservoirs in the Merrimack River Basin are coordinated to reduce flood stages in the densely populated downstream areas of New Hampshire and Massachusetts.

b. MacDowell Dam is located on the Nabanusit Brook, which is a tributary of the Contoocook River, 1/2 mile upstream from the village of West Peterborough, New Hampshire. The reservoir has a drainage area of 44 square miles.

c. Authority.

Authorization for this project is contained in the Flood Control Act approved June 22, 1936, Public Law No. 738, 74th Congress as amended by Public Law No. 111, 75th Congress, approved May 25, 1937 and further amended by Public Law No. 761, 75th Congress, approved June 28, 1938. The project was approved by OCE on 30 April 1940 as part of comprehensive flood control plan for the Merrimack River Basin. Construction commenced in March 1948. The project went into operation in 1950. The construction cost totaled \$2,034,000 which included lands and damages costs of \$306,000.

2. GENERAL DESCRIPTION.

The Dam is a rolled earth fill structure with a three-foot dumped-rock cover on the upstream slope and with six inches of gravel slope protection on the downstream slope.

The outlet works which are in the right abutment consist of the intake channel, an intake structure, intake tower, a 7'-0" square reinforced-concrete conduit, a stilling basin, and an outlet channel. Flows through the conduit are controlled by three 3'-0" x 7'-0" mechanically operated gates. A remote spillway with a 100 foot long ogee weir is located in a saddle about four miles to the northeast of the dam. A dike was constructed on the left side of spillway to act as a training levee.

3. GEOLOGY & FOUNDATIONS.

a. Dam. Bedrock underlying the embankment is a highly fractured, silicious schist which is exposed on the right abutment. This rock is deeply covered by a sandy, silty glacial till on the opposite valley slope. Downstream of the centerline of the dam, the overburden of till thickens over the highly weathered rock.

b. Spillway. The bedrock in the vicinity of the spillway is an unweathered, slightly fractured porphyritic granite which is exposed on the upstream part of the weir and on the right abutment. Downstream in the channel the rock slopes away and glacial till forms the floor of the channel.

c. Outlet Works. The intake structure and the gate house are founded on highly fractured schist.

d. Foundation Explorations.

(1) The layout of the explorations for the embankment and spillway may be seen in Plate Nos. 4 and 8 of Appendix III respectively.

(2) The geologic sections of the embankment and the spillway areas are shown on Plate Nos. 5, 6, 7, and 8 of Appendix III.

4. EMBANKMENT.

The dam embankment is of the zoned type with a central impervious core and contiguous impervious foundation cut-off extended to routed bedrock or glacial till. The core is flanked by zones of random and impervious fill. The upstream slope is covered by a 3-foot layer of dumped rock. The downstream slope is covered by a 6-inch layer of screened gravel except for the portion near the toe where there is a 3-foot layer of dumped rock. Details of the embankment section are shown on plates 10 and 11 of Appendix III.

5. OUTLET WORKS.

a. General. The outlet works are founded on bedrock, the intake structure, gatehouse, conduit, outlet structure and stilling basin are all in an area where the rock is a weathered schist. Most of the discharge channel is cut into the till overburden. The intake structure is a concrete faced rock walled structure which leads to the gate passages. The stop-log slots are in front of the service gates for each gate passage. The service gates are operated by 3 separate motorized worm-gear lifts. Downstream of the gates is a transition which narrows vertically and horizontally to the 7'-0" square, cast in place conduit. A stilling basin was provided downstream of the conduit outlet structure. The control tower, which is above the intake structure, is connected to the roadway on top of the dam river a service bridge.

b. The approach channel is excavated in earth and rock is 175 feet long and 21 feet wide at the bottom. The earth-cut side slopes are 1 on 2 while the rock-cut slopes are 1 on 4.

c. Intake Structure and Gate House. The intake structure is located near the right abutment of the dam. The structure is of reinforced concrete on a rock foundation with its operating room floor at elevation 967.0 m.s.l. The hoists to operate the gates are on the main floor of the gate house, one over each of the service gate wells. The overhead crane which has a capacity of 15 tons is of the double girder bridge type and is electrically operated. The water passages are partially lined with steel conduits. A gasoline engine-driven generator is provided for an emergency power source. See Plate Nos. 24 & 25 of Appendix III.

d. Conduit. The conduit is 248 feet long and has an upstream invert elevation of 903 feet m.s.l. It is cast in place reinforced concrete with inside dimensions of 7'-0" by 7'-0". Seep fins were provided at the construction joints. See plates 16 of appendix III.

e. Stilling Basin. The stilling basin is constructed of reinforced concrete and is approximately 77'-0" long. The bottom width varies from 7'-0" at the conduit exit to 25'-0" at the downstream end. The invert elevation drops from 903 feet m.s.l. to 898 feet m.s.l., forty-one feet from the portal. The floor then remains level until it reaches a 3 foot high concrete end sill. See Plates 17 and 18 of appendix III.

6. SPILLWAY.

The spillway and discharge channel are located in the upper reaches of the reservoir approximately four miles from the dam. This location was selected due to the availability of surface rock for the foundation of the spillway weir. Discharges over the spillway will flow into Ferguson Brook and thence into the Contoocook River. The spillway weir is an unreinforced concrete structure with a crest elevation of 946.0 m.s.l. and a crest length of 100'. The approach channel is approximately 1,900 feet long and was excavated from earth and rock. The channel varies from 150' wide at the entrance to 100' wide at the spillway weir. The channel invert is at elev. 941.0 m.s.l. The design discharge capacity is 17,800 cfs with a surcharge of 15.0 feet. The discharge channel narrows to 60 feet approximately 900 feet downstream of the weir. Downstream of the weir there is a 2,450 foot long low training dike on the left bank to confine the flow to the spillway discharge channel.

7. SERVICE BRIDGE.

Access to the gate house is provided by a 2 span service bridge from the roadway on top of the dam. The bridge has two 36'-0" spans. The roadway is 9'-8" from curb to curb and is designed for H-20 loading. See plate 19 of Appendix III.

In October 1972 a crack was observed in the west haunch which supports the service bridge at the intake tower. Temporary measures have been taken to protect the haunch and permanent repairs will be made in the near future. The bridge has been closed to vehicular traffic until these repairs are completed.

8. INSTRUMENTATION.

At the time of construction 6 pizometers were installed along the right abutment downstream of the outlet works. Readings were discontinued soon after construction was completed. There are currently unoperative and there are no recent readings available.

9. PAST OPERATIONS.

Since the project became operational in 1950 the major impoundments have been:

<u>Year</u>	<u>Date</u>	<u>Maximum Stage ft.</u>	<u>Maximum W.S. Elev. ft.m.s.l.</u>	<u>Storage Acre ft.</u>	<u>Use % of Total</u>
1951	Apr		934.0	6,700	52
1956	Jan		935.6	7,400	58
1958	Apr		931.2	5,750	43
1960	Apr		934.8	7,050	55

During these impoundments the project has operated in a satisfactory manner and without problems.

10. PRIOR INSPECTIONS.

This project was previously inspected in May 1967. A copy of this report is contained in Appendix I.

APPENDIX 1

PRIOR INSPECTION REPORTS

<u>Title</u>	<u>Page</u>
Inspection of May 1967	1-2

EDWARD MacDOWELL DAM
NABANUSIT BROOK
PETERBOROUGH, NEW HAMPSHIRE
INSPECTION REPORT

5. MacDowell. -This project was inspected on 24 May 1967. The weather was good - sunny - 45° - low humidity - wind, moderate. The following were present during the inspection:

Mr. J. C. Dingwall, NED, Spec. Asst. Chief, Engineering Div
Mr. J. F. Lamond, NED, Concrete Section
Mr. P. B. Heidema, NED, Soils Section
Mr. G. H. Dolloff, NED, Construction Division
Mr. F. N. Ciccone, NED, Operations Division
Mr. W. M. Hoxie, NED, Safety Branch
Mr. G. A. Miller, NED, Operator-in-Charge
Mr. K. B. Wetherbee, NED, Asst. Damtender

The water level in the pool was at El. 912.0, the same elevation as the pool at Varney Mills Dam located immediately downstream. This project became operational in 1950. The maximum pool to date was in January 1956 with 36 feet of water against the dam which has a maximum height of 67 feet.

(a) Dam. - No evidence of settlement misalignment or seepage was observed. The rock slope protection was in fair to good condition.

(b) Outlet Works. - An examination of the concrete in the intake structure showed one vertical crack about 3 feet long at Station 1+40 in the east wall between Elevations 915 and 918. The vertical expansion joints in both the east and west walls at Station 1+73 were leaking over a length of 9 feet between Elevations 904 and 913. The monolith in the east wall between Stations 1+35.44 and 1+53.43 showed horizontal movement had occurred which has caused a misalignment of about 2 inches. All other joints were tightly bonded and in good alignment. The appearance of the concrete was very good. The stilling basin showed four cracks. The first was 1 foot long in the west wall at Station 4+86.8 between Elevations 916 and 917; the second was 1 foot long in the east wall at Station 4+86.8 between Elevations 916 and 917; the third was 1 foot long in the east wall at Station 4+68.8 between Elevations 916 and 917; and the fourth was 1 foot long in the conduit headwall at Station 4+48.8 between Elevations 916 and 917. The water level being at Elevation 912, the examination of joints was limited to between Elevations 912 and 917. All joints observed were tightly bonded and in good alignment. The appearance of the concrete was very good. The single, 7-foot square conduit was not inspected because the pool could not be lowered at the Varney Mills Dam.

(c) Spillway Weir and Retaining Walls. - The concrete in the spillway weir was free of cracks. All construction and contraction

joints were tightly bonded and in good alignment. The appearance of the concrete was very good. The spillway south retaining wall showed 2 cracks and 3 leaking joints. The first crack was 2 feet long, running horizontally at Elevation 946 and extending from the axis of the spillway weir for 2 feet upstream. The other crack was 7 feet long, running vertically and horizontally between Elevations 944 and 950 at 5 to 8 feet downstream of the spillway weir axis. Two feet of vertical contraction joint located at 8 feet upstream of the spillway weir axis between Elevations 948 and 950 was leaking. Eleven feet of vertical contraction joint located 20 feet downstream of the spillway weir axis between Elevations 938 and 949 were leaking. Twenty-five feet of horizontal construction joint located 19 to 44 feet downstream of the spillway weir axis at Elevation 943 showed evidence of having leaked. All other joints were tightly bonded and in good alignment. The appearance of the concrete was very good. The spillway north retaining wall showed one crack and one joint indicating evidence of leakage. A vertical crack, 4 feet long, was located 76 feet downstream of the spillway weir axis between Elevations 939 and 943. Four feet of horizontal construction joint located between 10 and 14 feet downstream of the spillway weir axis at El. 943 showed evidence of having leaked. All other joints were tightly bonded and in good alignment. The appearance of the concrete was very good.

(d) Service Bridge. - The concrete on the service bridge was free of cracks. Some minor spalling has occurred in the curbs of the deck. All joints were tightly bonded and in good alignment. The appearance of the concrete was very good.

Each concrete structure examined appeared to be in satisfactory operating condition and no remedial repairs were indicated to be required at this time.

APPENDIX II
PERIODIC INSPECTION CHECK LISTS

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PARTY ORGANIZATION	1
DAM EMBANKMENT	2
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	3
OUTLET WORKS - CONTROL TOWER	4
OUTLET WORKS - TRANSITION AND CONDUIT	5
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	6
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	7
OUTLET WORKS - SERVICE BRIDGE	8

PERIODIC INSPECTION

PARTY ORGANIZATION

PROJECT _____

DATE _____

TIME _____

WEATHER _____

W.S. ELEV. _____ U.S. _____ DN.S. _____

PARTY:

- | | |
|----|-----|
| 1. | 6. |
| 2. | 7. |
| 3. | 8. |
| 4. | 9. |
| 5. | 10. |

PROJECT FEATURE

INSPECTED BY

REMARKS

- | | |
|-----|--|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |
| 8. | |
| 9. | |
| 10. | |

PERIODIC INSPECTION CHECK LIST

PROJECT _____	DATE _____
PROJECT FEATURE _____	NAME _____
DISCIPLINE _____	NAME _____
AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u> Crest Elevation Current Pool Elevation Maximum Impoundment to Date Surface Cracks Pavement Condition Movement or Settlement of Crest Lateral Movement Vertical Alignment Horizontal Alignment Condition at Abutment and at Concrete Structures Indications of Movement of Structural Items on Slopes Trespassing on Slopes Sloughing or Erosion of Slopes or Abutments Rock Slope Protection - Riprap Failures Unusual Movement or Cracking at or near Toes Unusual Embankment or Downstream Seepage Piping or Boils Foundation Drainage Features Toe Drains Instrumentation System	

PERIODIC INSPECTION CHECK LIST

PROJECT _____

DATE _____

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u> a. Approach Channel Slope Conditions Bottom Conditions Rock Slides or Falls Log Boom Debris Condition of Concrete Lining Drains or Weep Holes b. Intake Structure Condition of Concrete Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT _____

DATE _____

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OPERATING HOUSE AND GATE SHAFTS</u>	
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Hoists	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

PERIODIC INSPECTION CHECK LIST

PROJECT _____

DATE _____

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT _____

DATE _____

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel	

PERIODIC INSPECTION CHECK LIST

PROJECT _____ DATE _____
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	
c. Discharge Channel	
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Channel	
Other Obstructions	

PERIODIC INSPECTION CHECK LIST

PROJECT _____

DATE _____

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

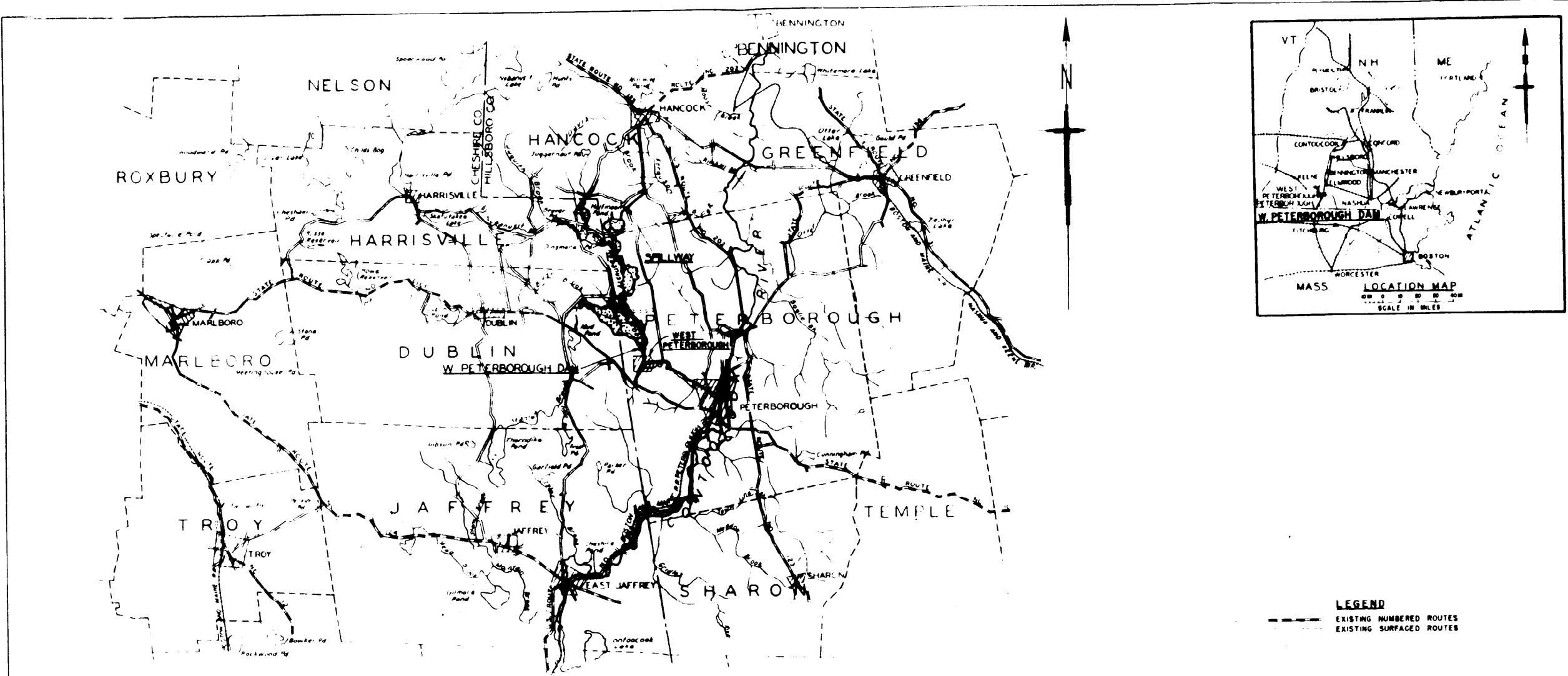
AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX III

SELECTED RECORD DRAWINGS

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M78 - 50/3	GENERAL PLAN OF DAM	3
M78 - 50/4	GENERAL PLAN OF SPILLWAY & DIKE	4
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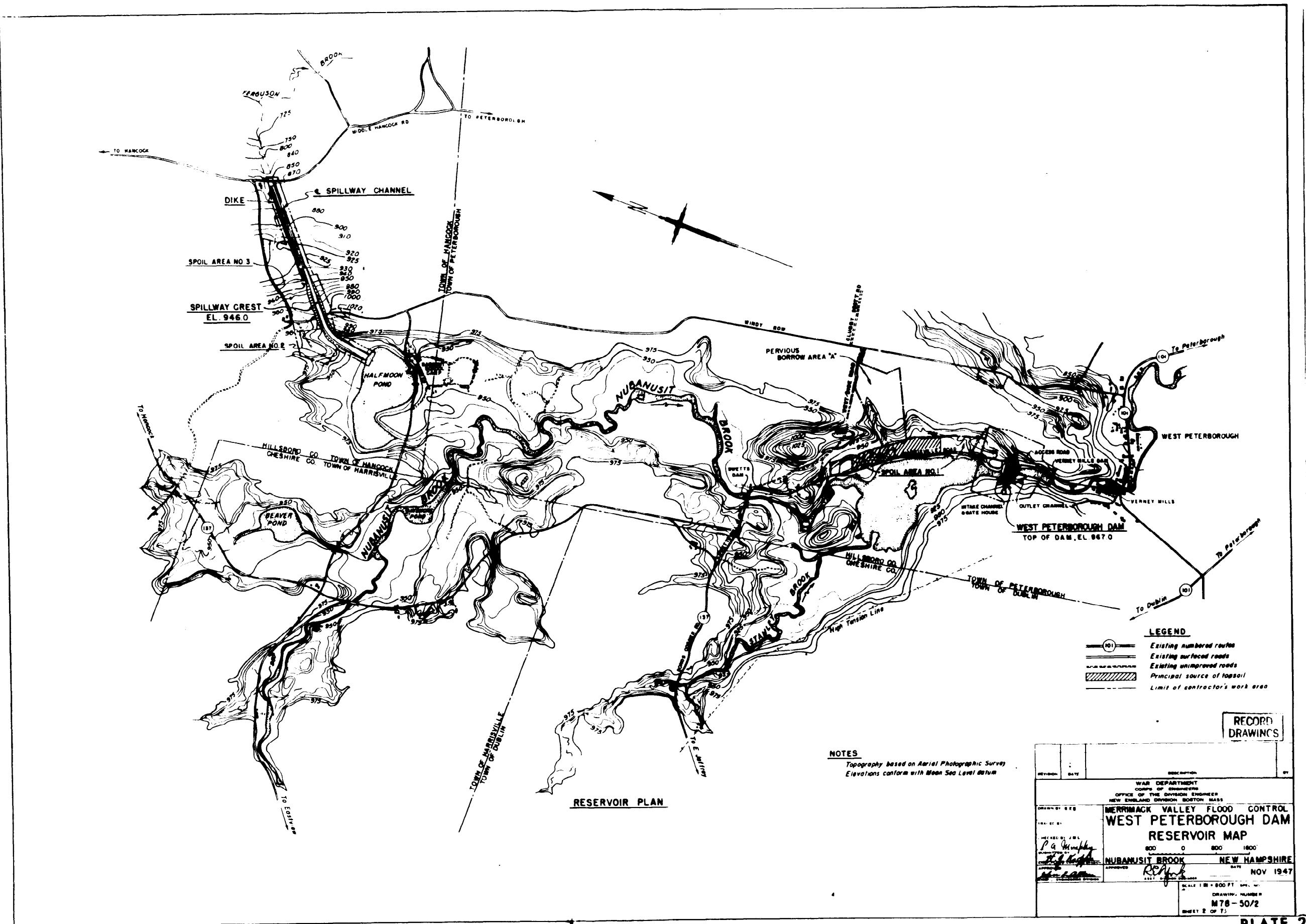
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M78 - 50/50	SPILLWAY DETAIL NO. 2	23
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M78 - 50/58	GATE HOUSE - GENERAL ARRANGEMENT OF EQUIPMENT NO. 2	26

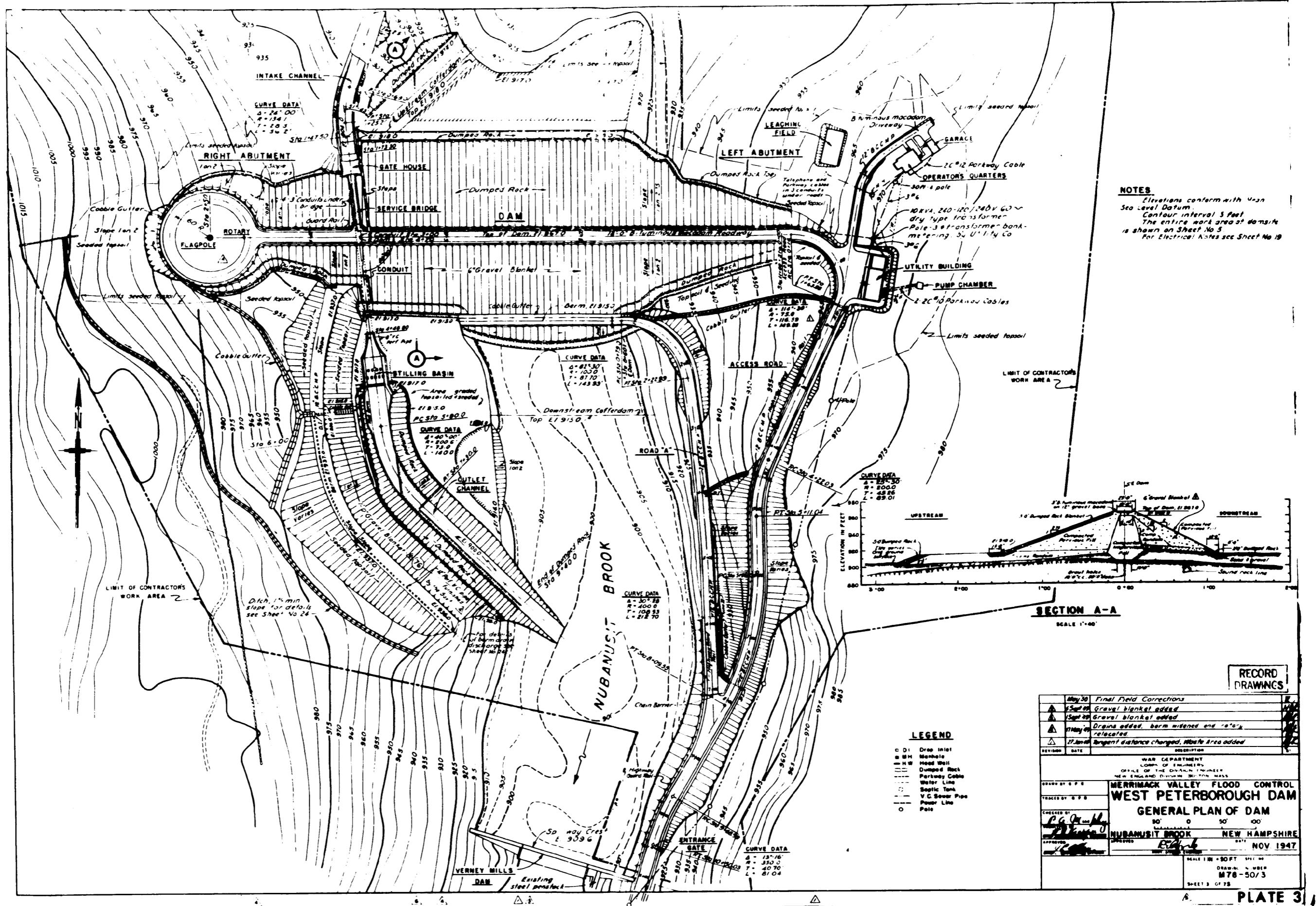


INDEX TO DRAWINGS								
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20	MAIN ENTRANCE GATE AND DETAILS	M78-50/20	107	SPILLWAY DISCHARGE CHANNEL AND DIKE - PLAN AND DETAILS	M78-50/107	104	GARAGE	M78-50/104
21	OUTLET WORKS - PLAN AND PROFILE	M78-50/21	108	SPILLWAY - PLANS AND SECTIONS	M78-50/108	105	RECONSTRUCTION OF HARRISVILLE ROAD	M78-50/105
22	OUTLET WORKS - SECTIONS NO 1	M78-50/22	109	SPILLWAY DETAILS NO 1	M78-50/109			
23	OUTLET WORKS - SECTIONS NO 2	M78-50/23	110	SPILLWAY DETAILS NO 2	M78-50/110			
24	OUTLET WORKS - MISCELLANEOUS DETAILS	M78-50/24	91	MISCELLANEOUS METALS - DETAILS NO 1	M78-50/91			
25	INTAKE CHANNEL WALLS	M78-50/25	92	MISCELLANEOUS METALS - DETAILS NO 2	M78-50/92			
26	INTAKE STRUCTURE - CONCRETE DETAILS NO 1	M78-50/26	93	MISCELLANEOUS METALS - DETAILS NO 3	M78-50/93			
27	INTAKE STRUCTURE - CONCRETE DETAILS NO 2	M78-50/27	94	GAGES - TILE AND STAFF	M78-50/94			

		DRAWINGS		
		Sheet 75 added to set		
		Revised sheets indicated in index		
		Revised sheets indicated in index		
		Revised sheets indicated in index		
		Revised sheet 142-143-144		
		Revised sheets indicated in index		
		Revised sheet indicated in index		
		Revised sheets indicated in index		
		Revised sheets indicated in index		
		REVISIONS		
DATE		DESCRIPTION		
WAR DEPARTMENT COE OF ENGINEERS OFFICE OF THE DIVISION ENGINEER NEW ENGLAND DIVISION BOSTON MASS				
MERRIMACK VALLEY FLOOD CONTROL WEST PETERBOROUGH DAM PROJECT LOCATION AND INDEX				
 				
 				
 				
 				
 				
 <img alt="Signature of Lt. Col. J. C. Gandy"				

PLATE 1

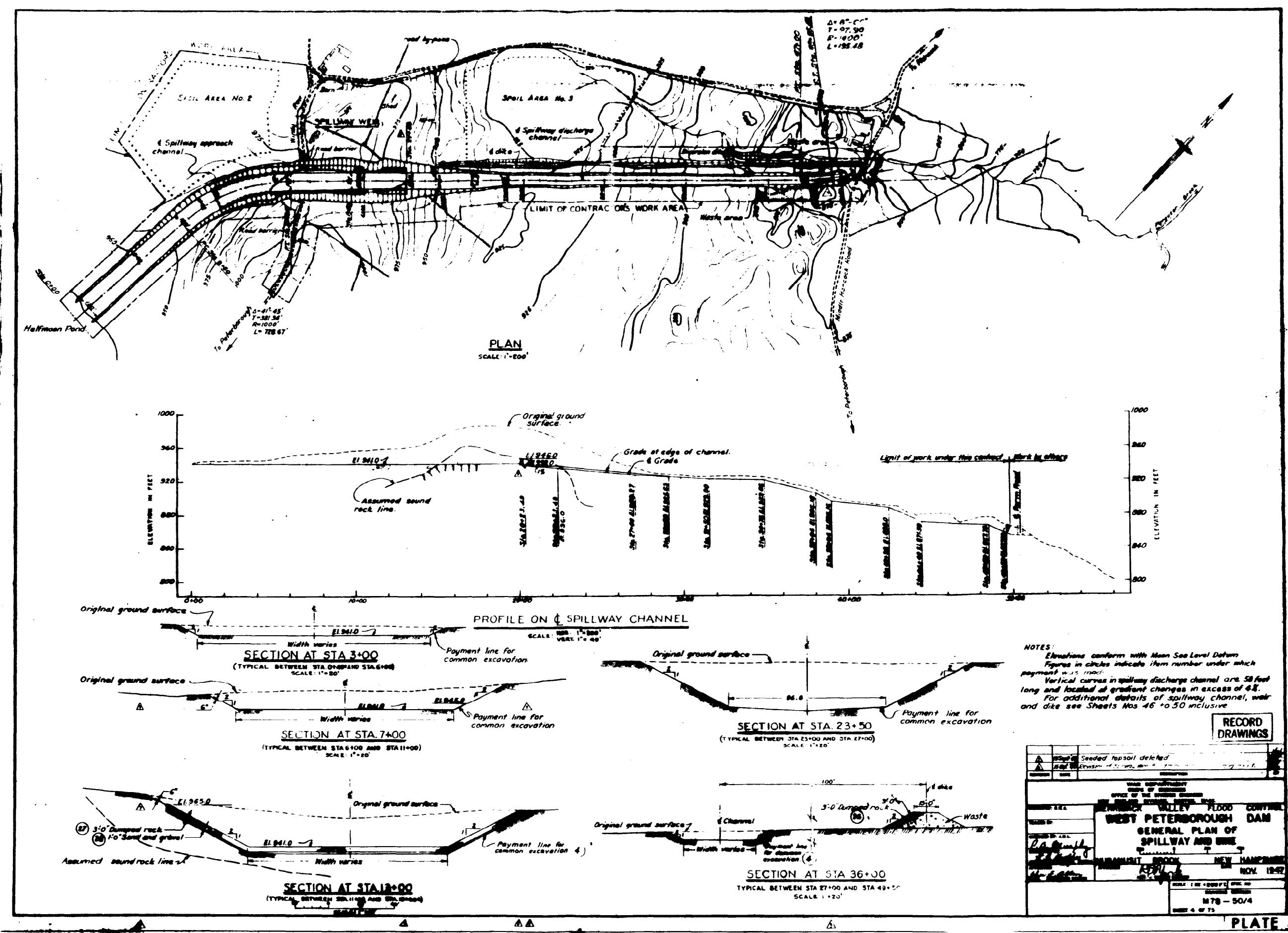




RECORD
DRAWINGS

REVISION	DATE	DESCRIPTION	REVISION
May 30		Final Field Corrections	
6 Sept 49		Gravel blanket added	
1 Sept 49		Gravel blanket added	
1 May 49		Dams added, berm widened and re- ^o rked relocated.	
17 June 49		Bentient distance changed, waste area added	
		REVISION	
U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY OFFICE OF THE DIVISION ENGINEER NEW ENGLAND DIVISION, BOSTON MASS.			
DRAWN BY G.P.S.	MERRIMACK VALLEY FLOOD CONTROL WEST PETERBOROUGH DAM GENERAL PLAN OF DAM		
TRACED BY G.P.S.	SO'	0	50' 100'
CHECKED BY <i>P.G. Jr. and M.L.</i>	MURAMUSIT BROOK		
APPROVED <i>J.C. Cottrell</i>	NEW HAMPSHIRE		
DEPLOPED	R-24-6 DATE NOV 1947		
SCALE 1 IN = 50 FT SPEC NO			
DRAWING NUMBER M76-50/3			
SHEET 3 OF 25			

PLATE 3



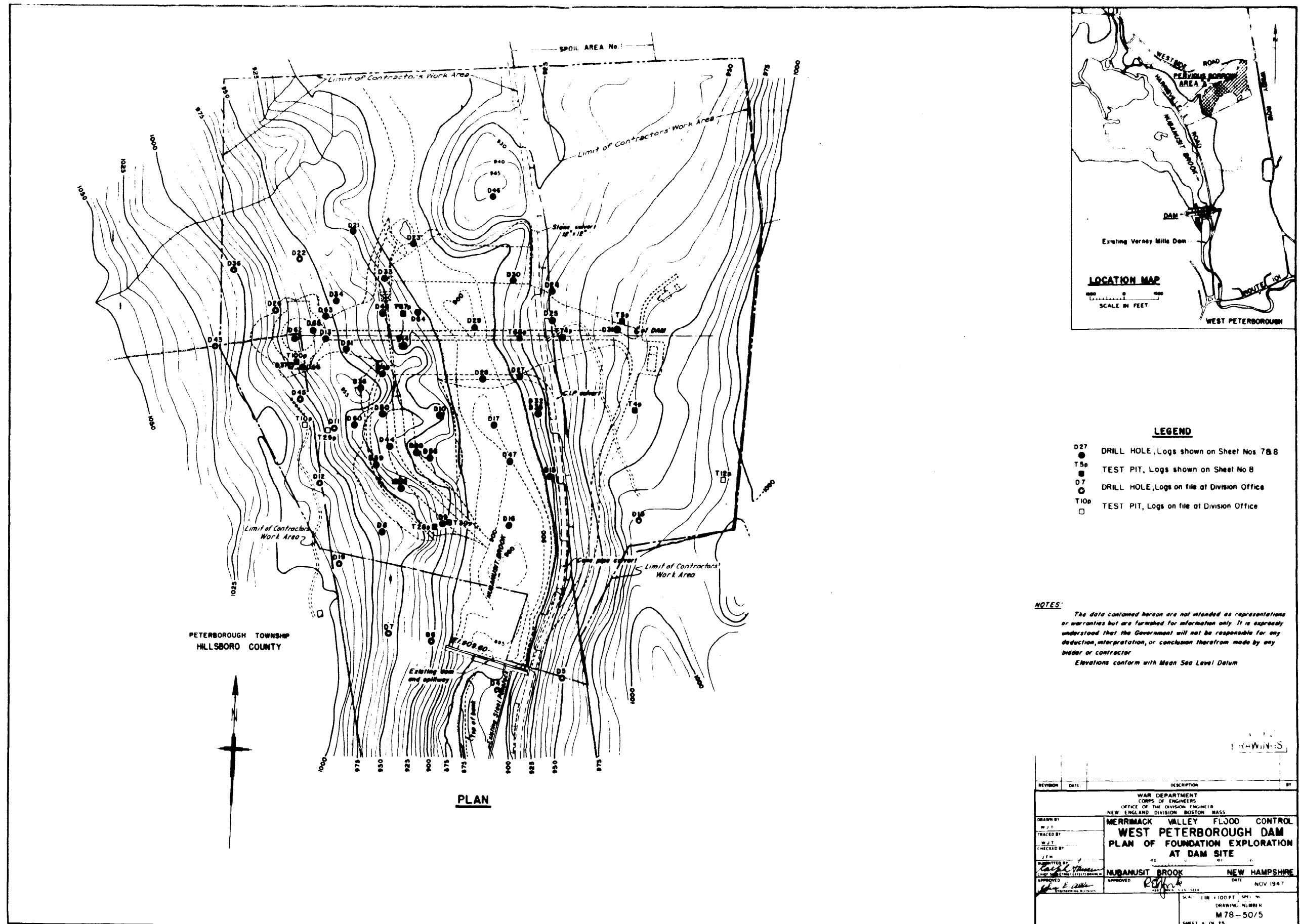
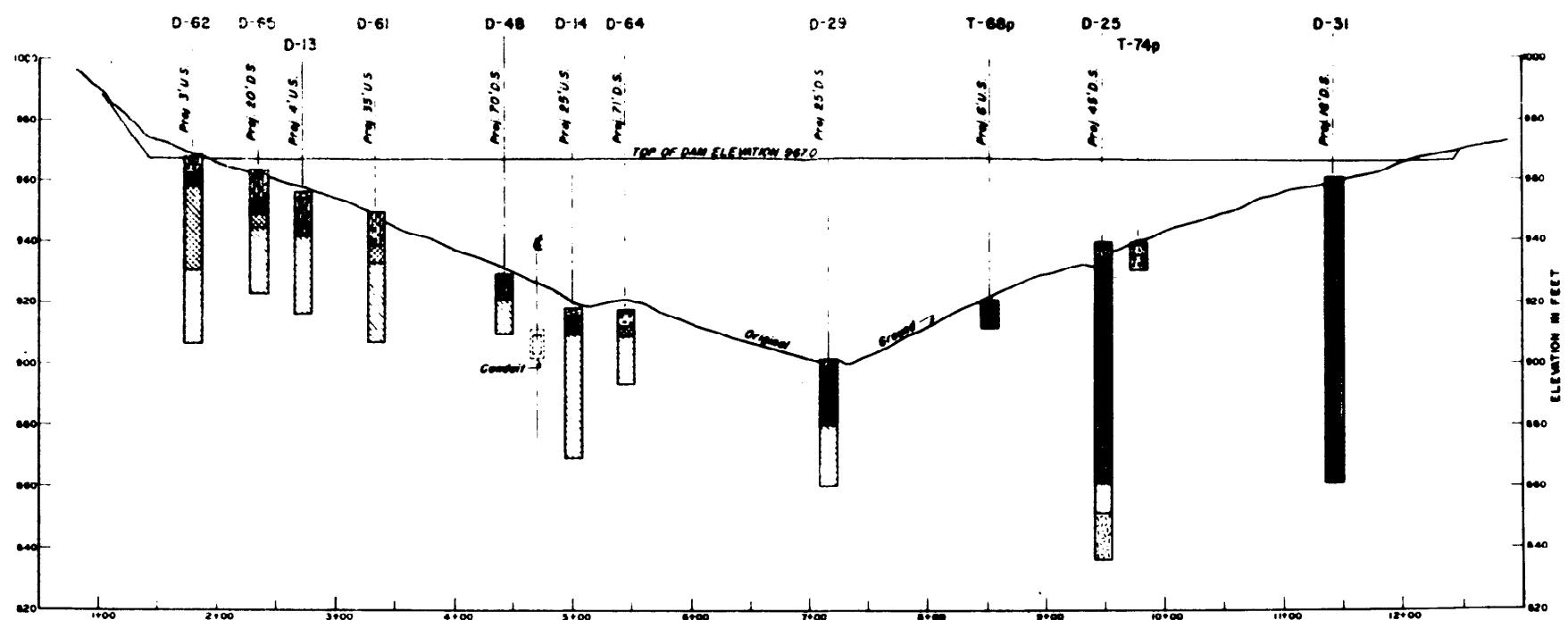


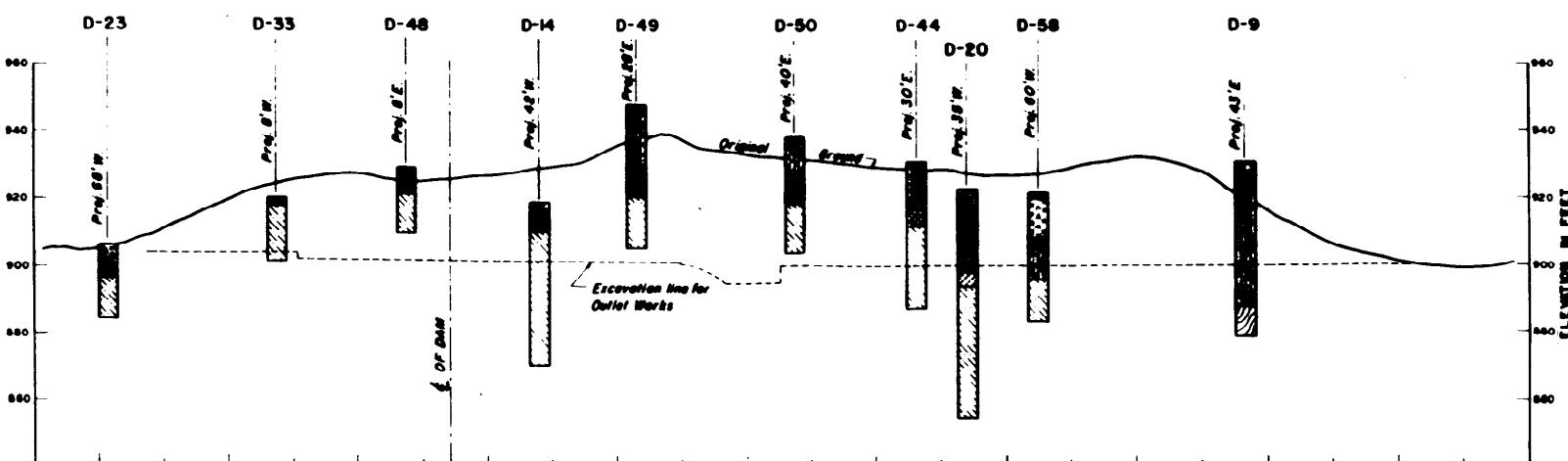
PLATE 5



PROFILE ON C DAM

(LOOKING UPSTREAM)

SCALE - HORIZONTAL 1'-50'-0"
VERTICAL 1'-20'-0"



PROFILE ON C OUTLET WORKS

SCALE - HORIZONTAL 1'-50'-0"
VERTICAL 1'-20'-0"

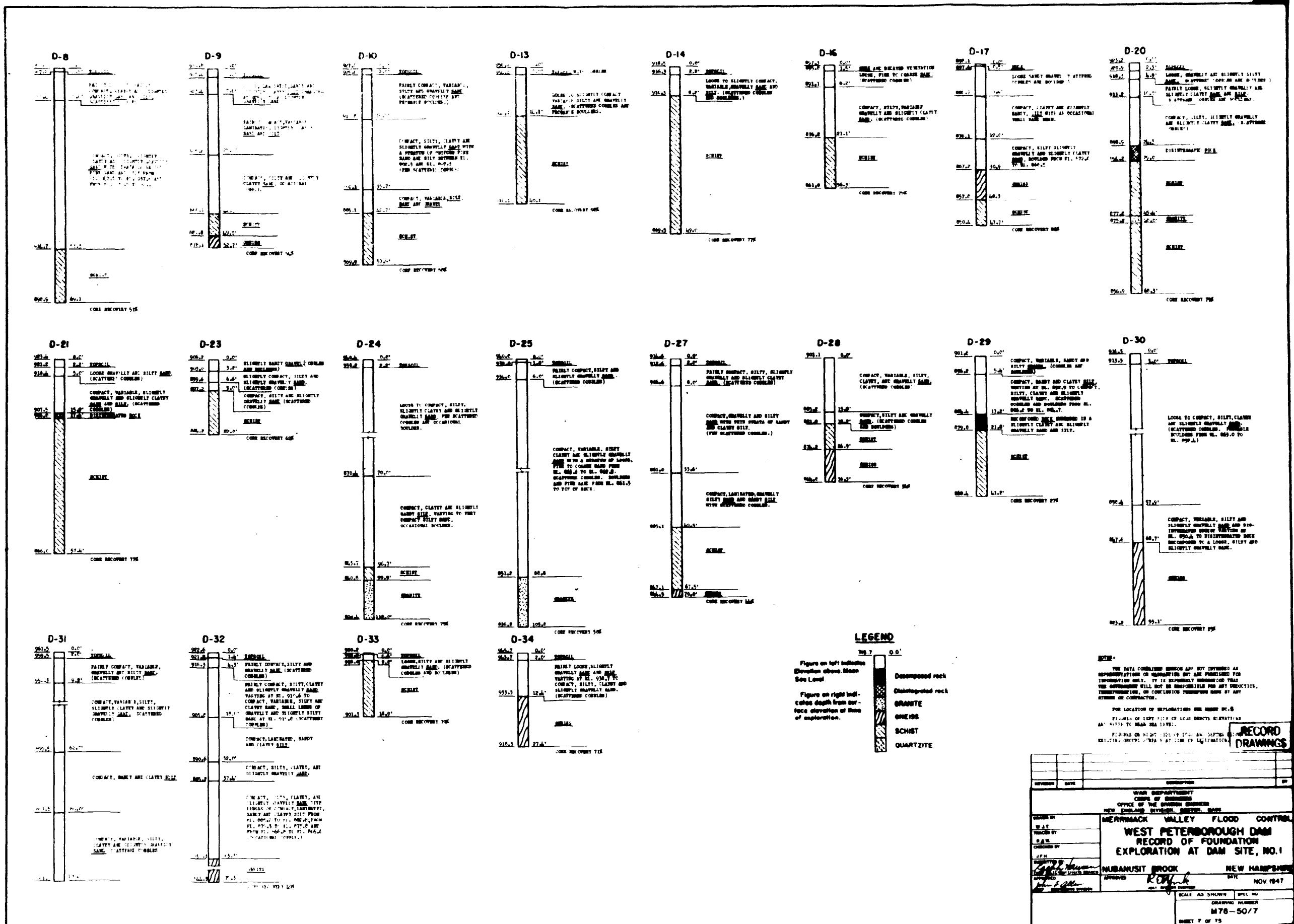
LEGEND	
TOPSOIL	Decomposed rock
FILL	Disintegrated rock
GRAVEL	GRANITE
SAND	GRANITE
SILT	SCHIST
CLAY	SCHIST
COBBLES	QUARTZITE
BOULDER (Shaded type of rock)	QUARTZITE
	SILTY CLAYEY TILL
	SANDY SILTY TILL
	SILTY TILL

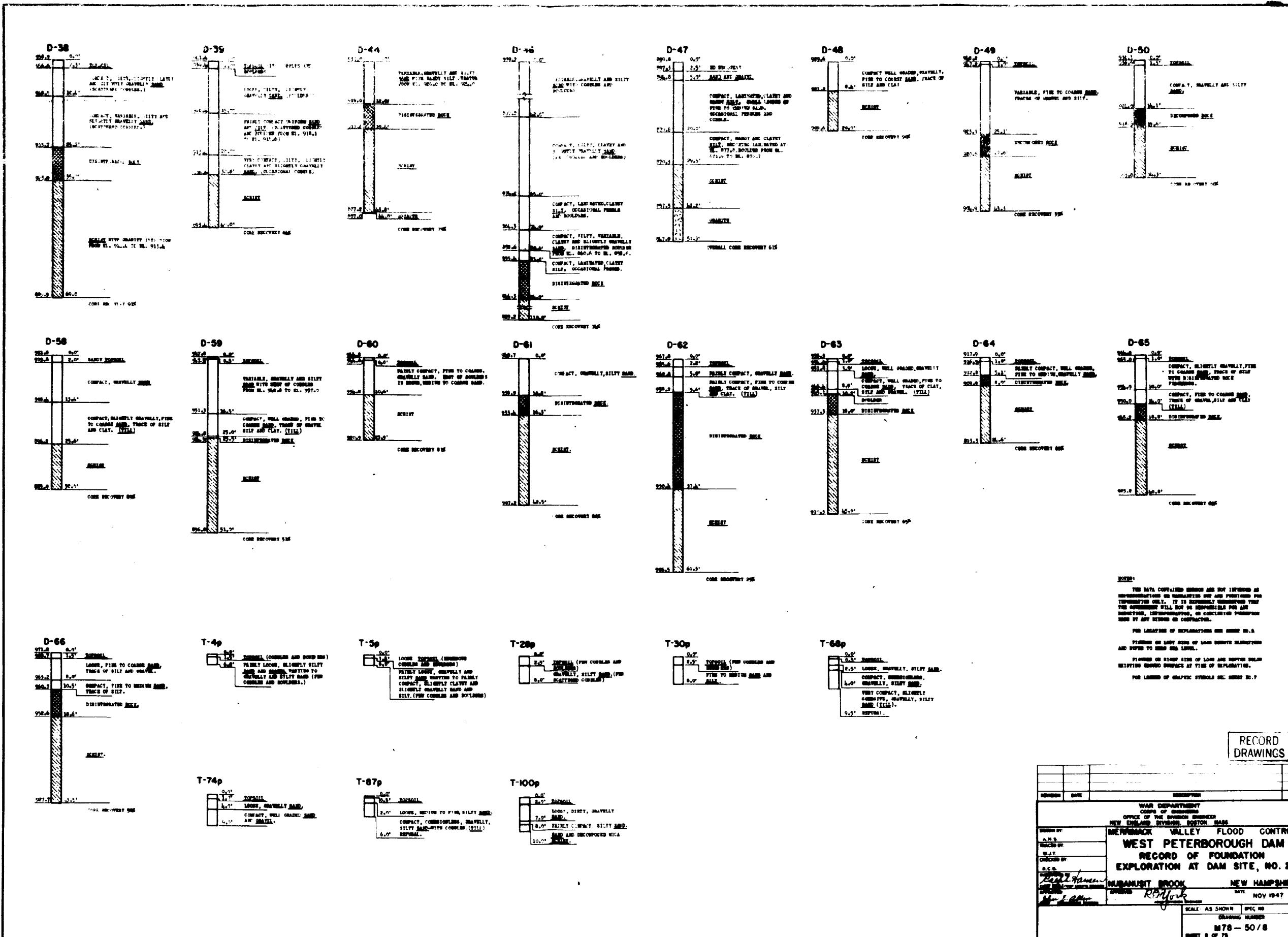
Indicates break in continuity of depth scale

NOTES -
For location of explorations see Sheet No 5
For log of exploration see Sheet Nos 7 & 8
Elevations conform with Mean Sea Level Datum
The data contained herein are not intended as representations or warranties but are furnished for information only. It is expressly understood that the Government will not be responsible for any deduction, interpretation, or conclusion therefrom made by any bidder or contractor.

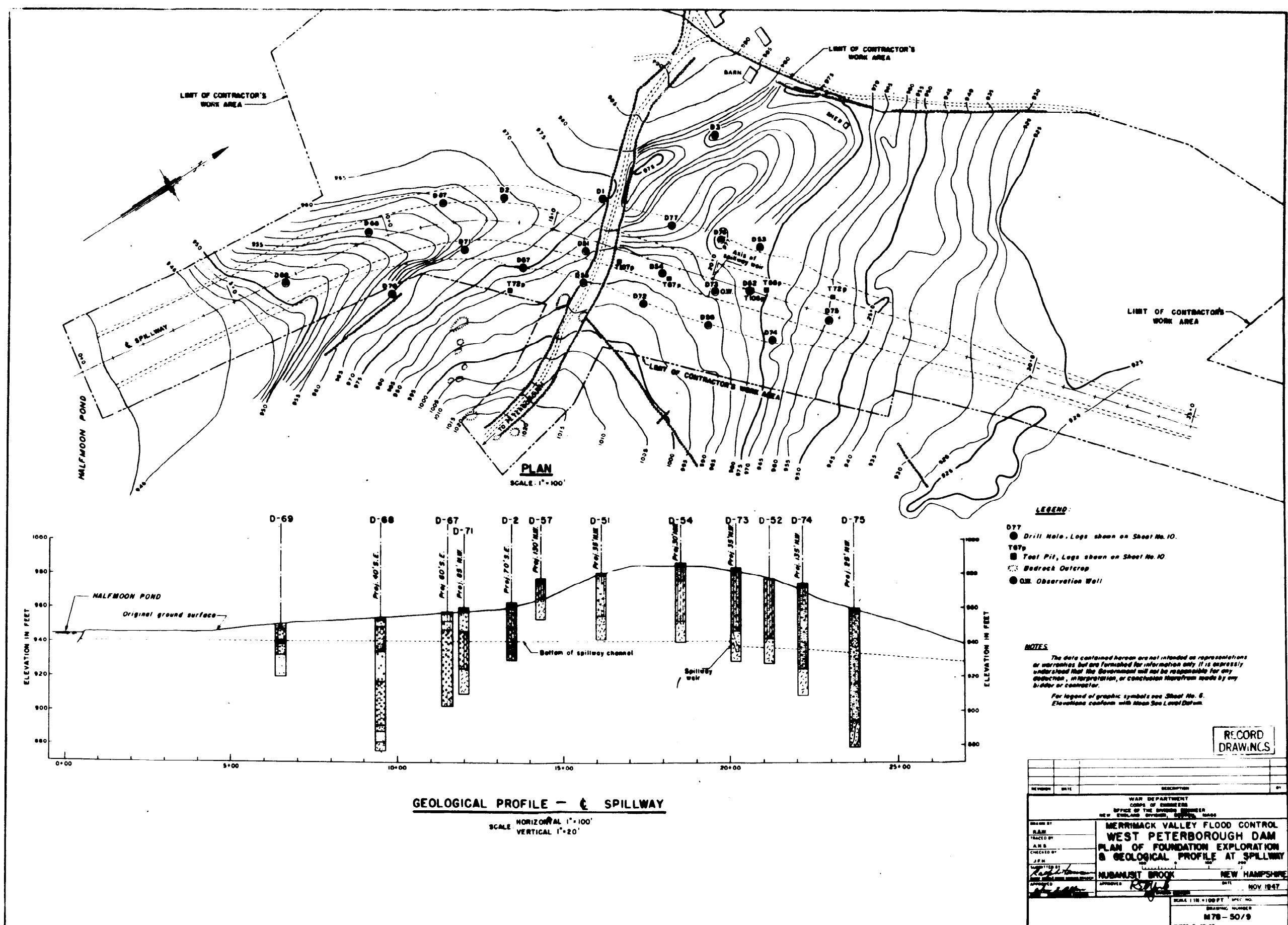
RECORD DRAWINGS

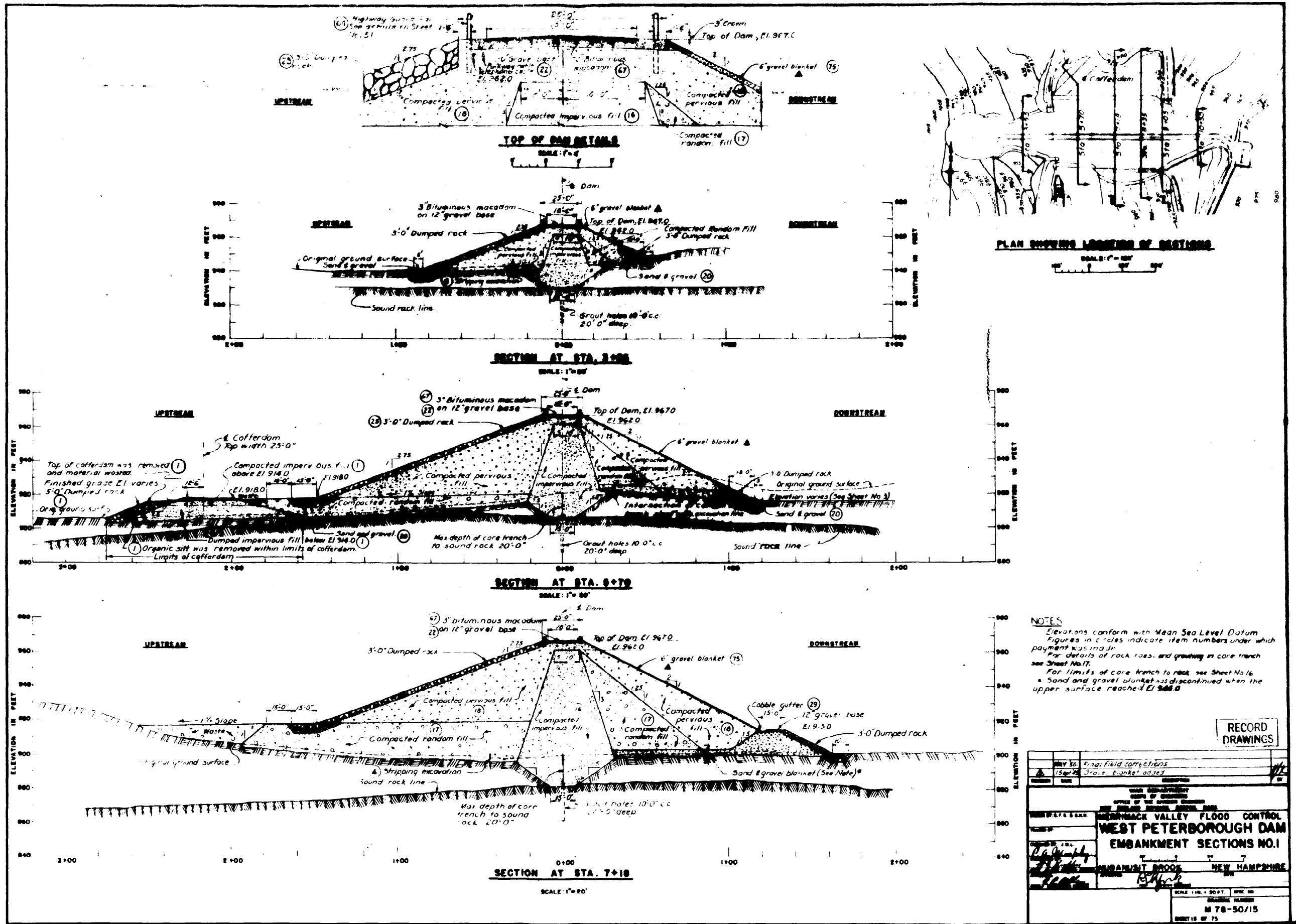
REVISION	DATE	DESCRIPTION
		WAR DEPARTMENT CORPS OF ENGINEERS OFFICE OF THE DIVISION ENGINEER NEW ENGLAND DIVISION BOSTON MASS
MADE BY		MERRIMACK VALLEY FLOOD CONTROL WEST PETERBOROUGH DAM
TRACED BY		GEOLOGICAL PROFILES AT DAM SITE
CHECKED BY		NO. C NO. L
APPROVED		INJANUSIT BROOK NEW HAMPSHIRE
APPROVED		DATE NOV 1947
		SCAL 1 IN = 50 FT 1 MI = 160 KILOMETERS
		DRAWING NUMBER M 78-50/6
		Sheet 6 of 15





RECORD
DRAWINGS





NOTES

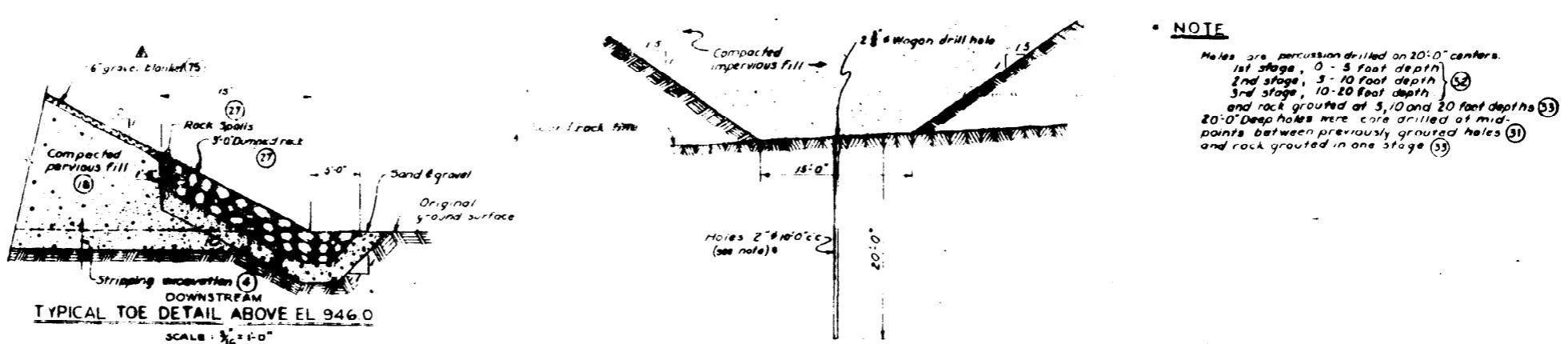
Elevations conform with Mean Sea Level Datum
Figures in circles indicate item numbers under which
payment was made
For details of rock toes, and grading in core trench
see Sheet No. 17.
For limits of core trench to rock see Sheet No. 16
Sand and gravel blanket discontinued when the
upper surface reached El 96.0

**RECORD
DRAWINGS**

TO CONTROL
MUGH DAM
ATIONS NO.1

NEW HAMPSHIRE

PLATE 10

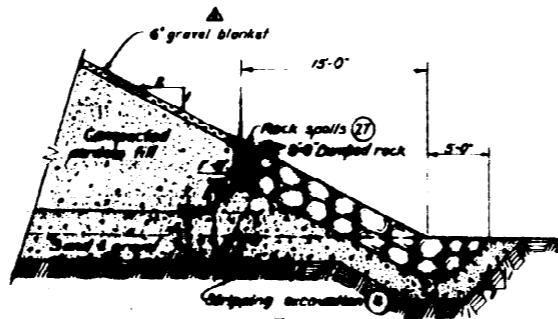


TYPICAL TOE DETAIL ABOVE EL 946.0

SCALE : 1 : 500

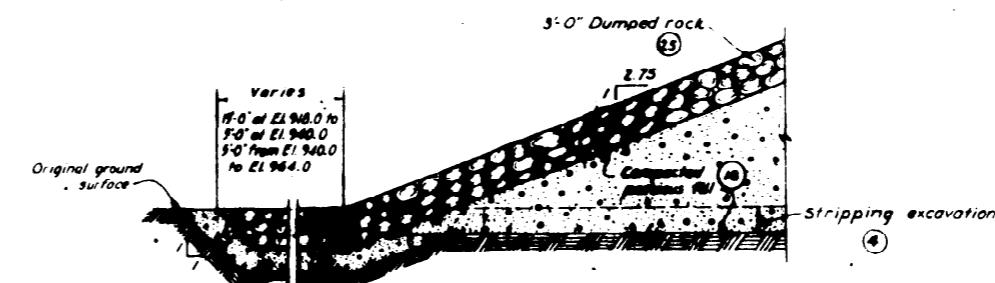
TYPICAL GROUTING DETAILS
IN CORE TRENCH

SCALE : 1' - 0"



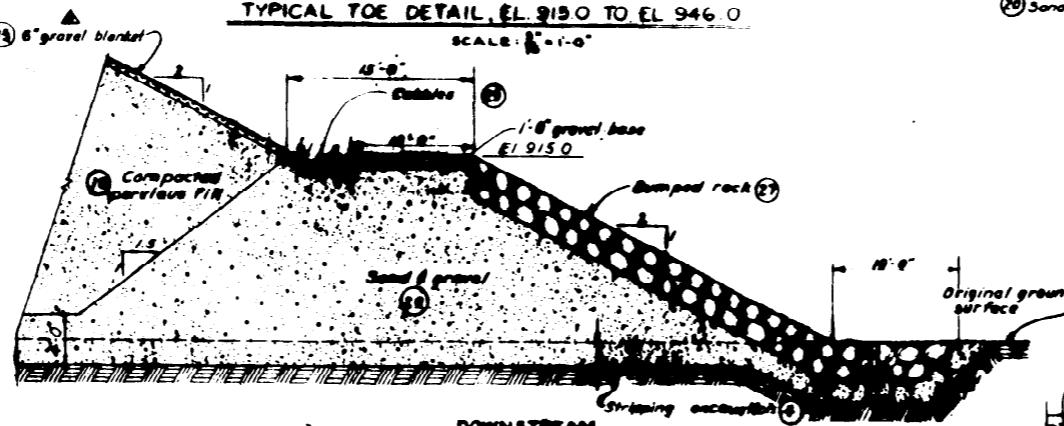
DOWNSTREAM
TYPICAL TOE DETAIL Elevation 815.0 to Elevation 846.0

SCALE



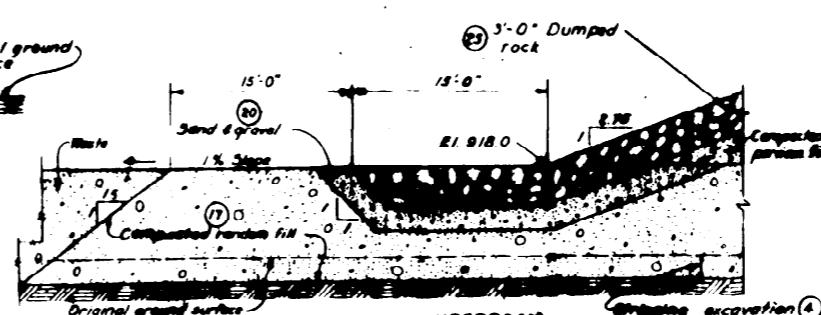
UPSTREAM

Page 47



TYPICAL TOE RETAIL BELOW EL 8150

SCALE : $\frac{3}{4}$: 1

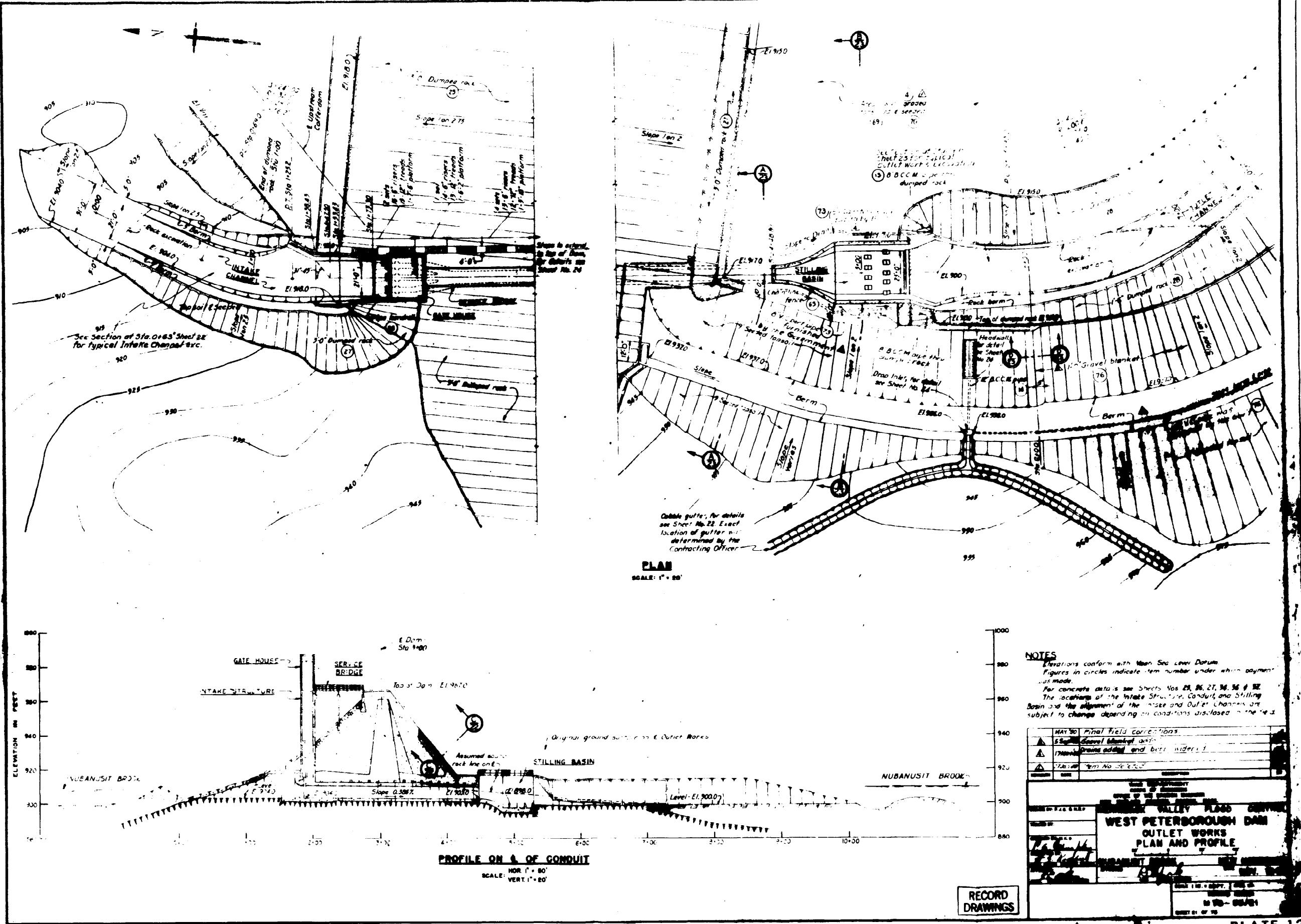


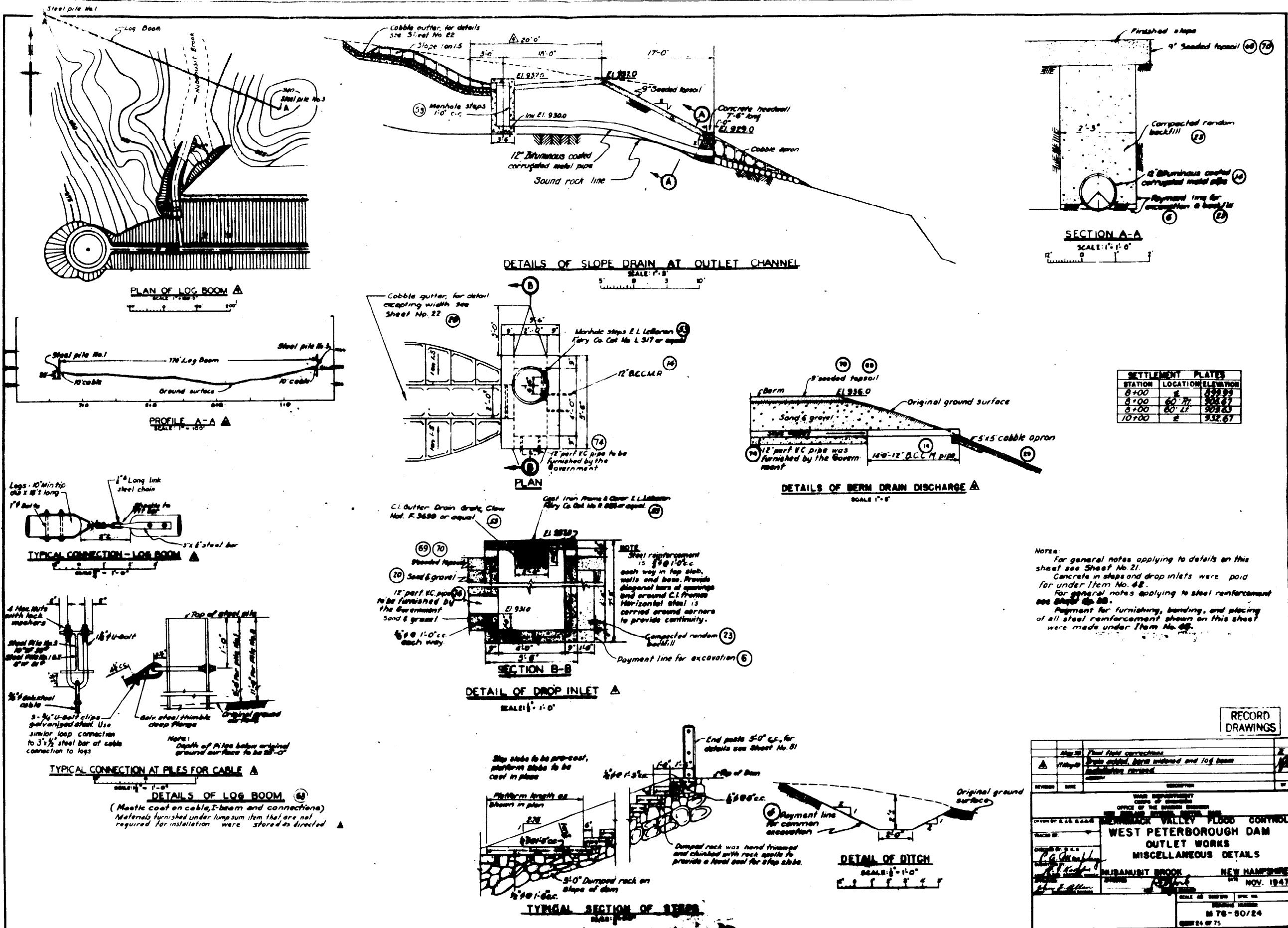
TYPICAL TOE DETAIL BELOW EL. 218.0

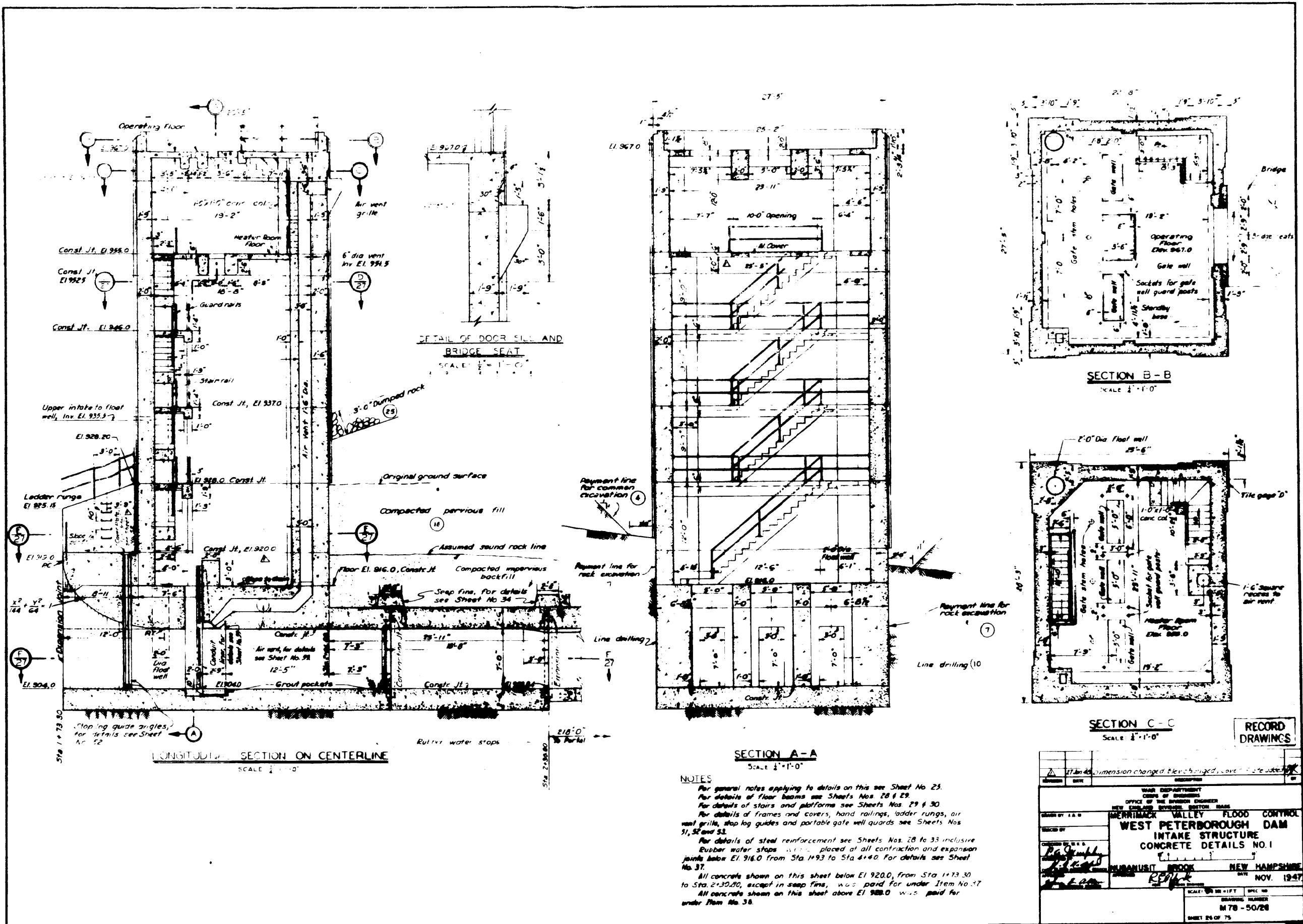
260-5 A

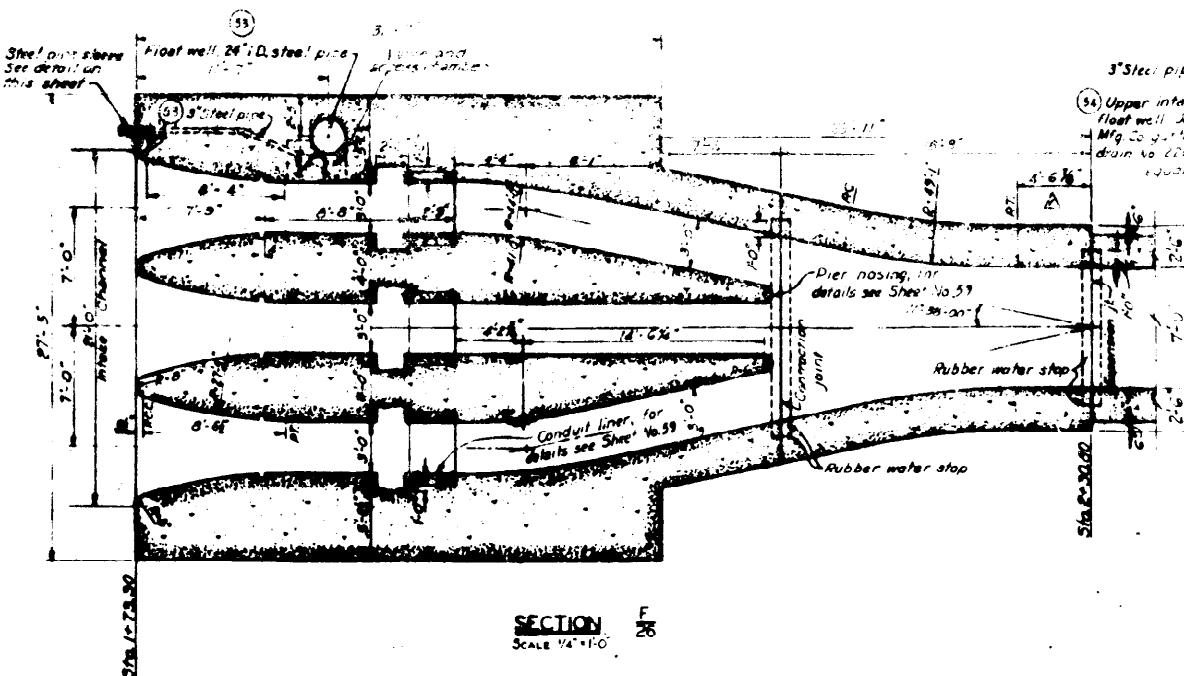
NOTES

NOTES For general notes applying to details on this sheet, see Sheet No. 15.

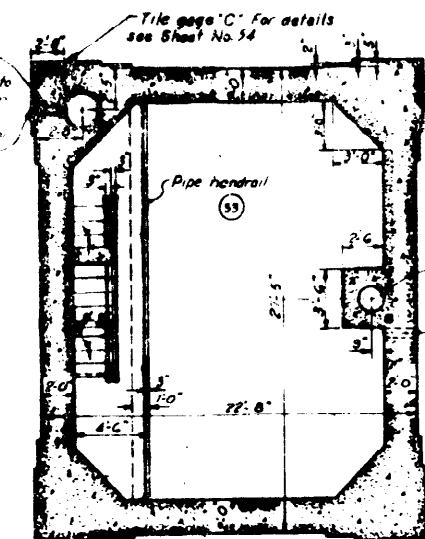




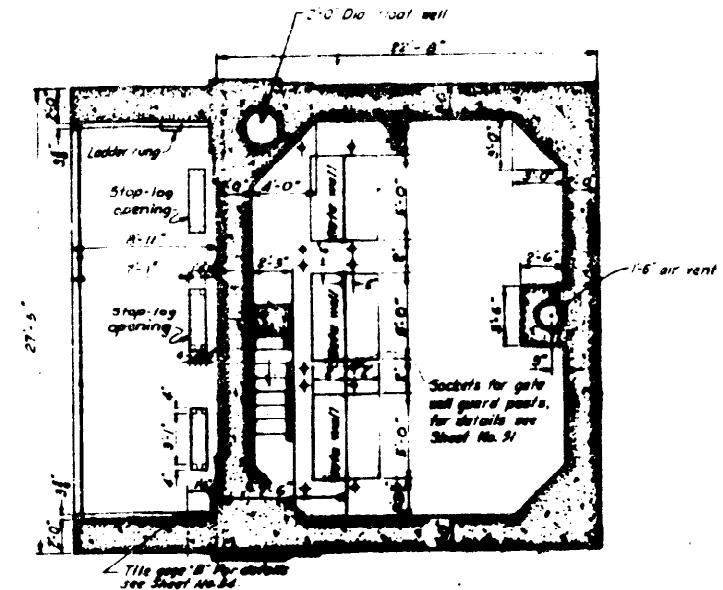




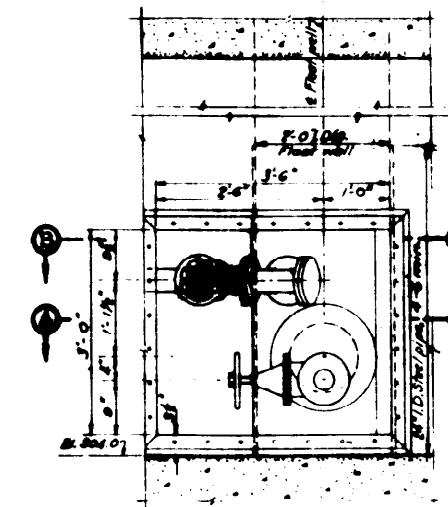
SECTION F
Scale 1/4" = 1'-0"



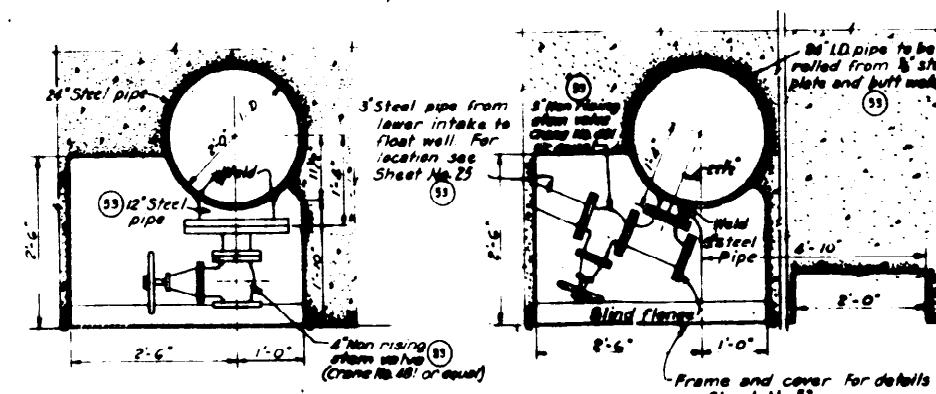
SECTION
SCALE 1/4 = 1'-0"



SECTION 18



ELEVATION



SECTION A -

FLOAT WELL - VALVE AND ACCESS CHAMBER

13-
1

NOTE

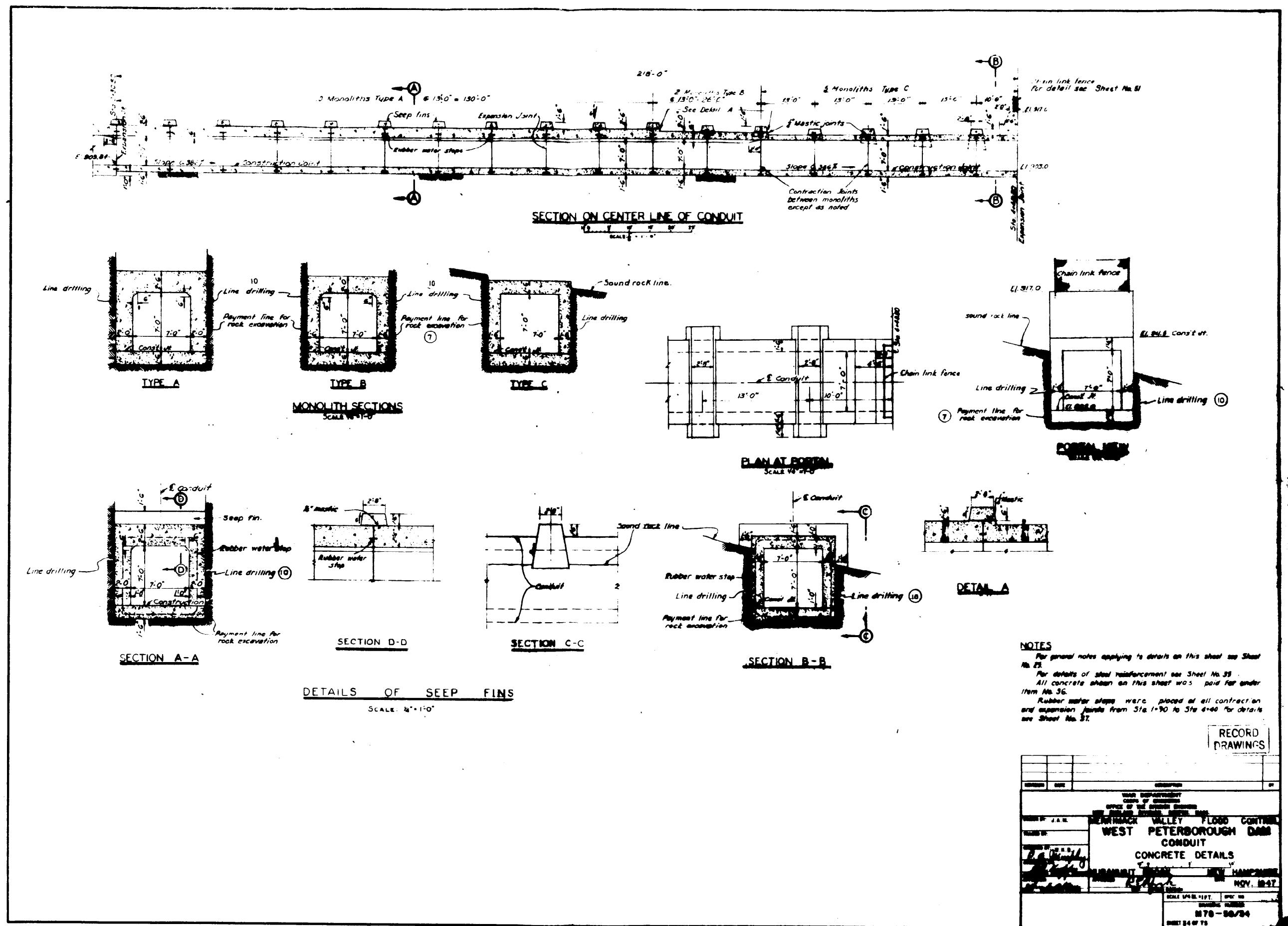
NOTES:
For general notes applying to details
on this sheet, see Sheet No. 25
For details of steel reinforcement, see

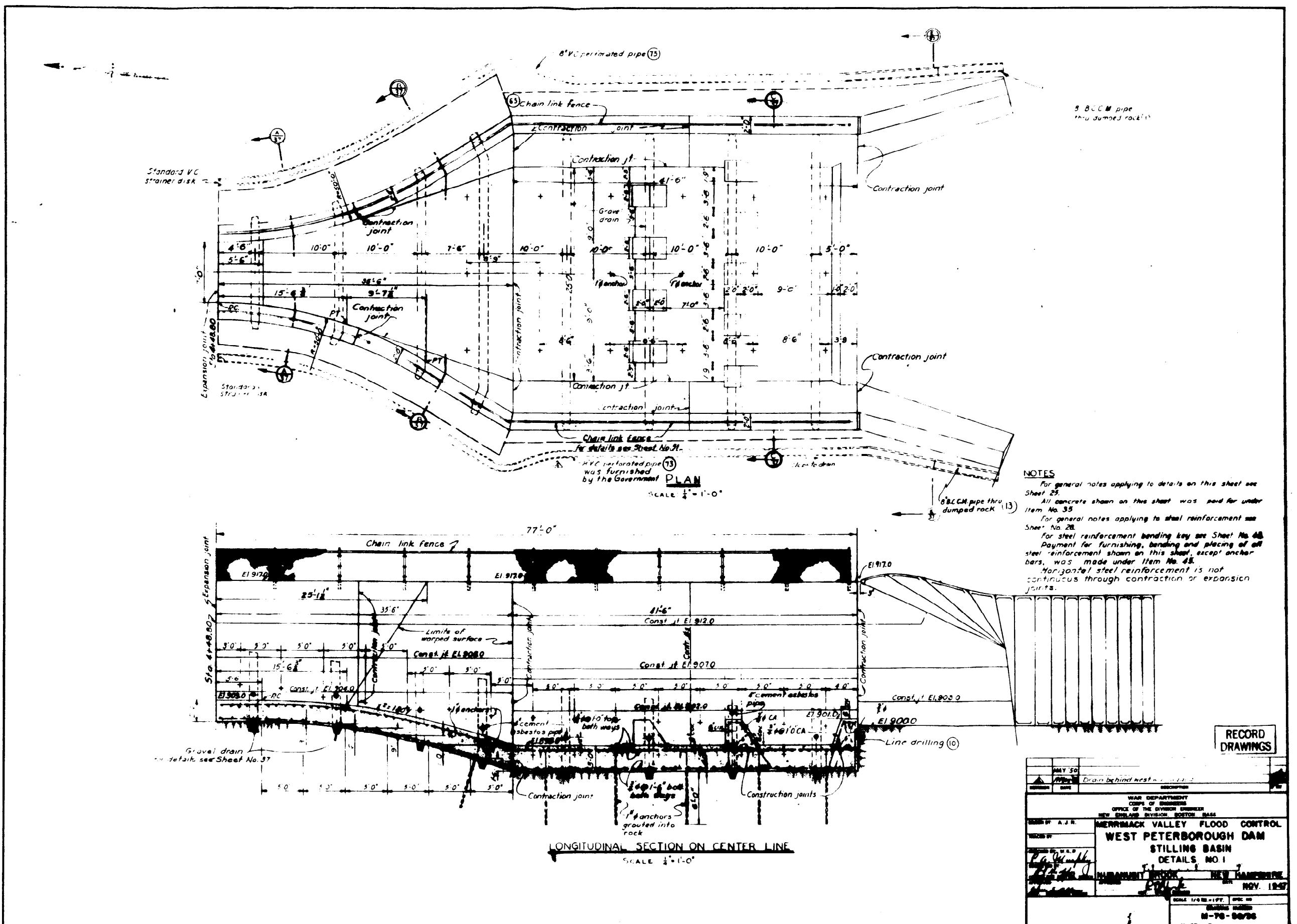
Rubber water stops were placed at all contraction and expansion joints below

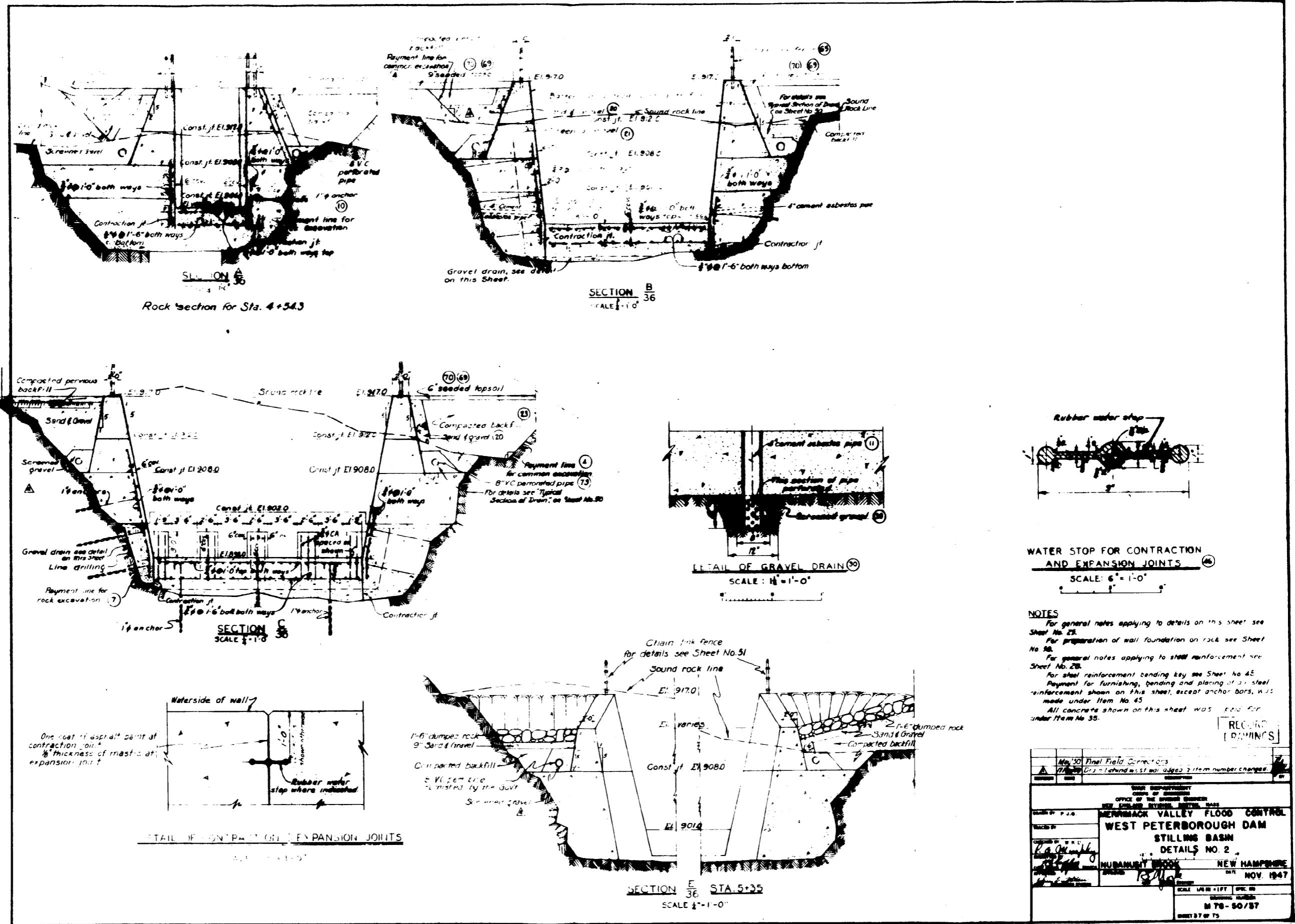
All concrete shown on this sheet below
El. 920.0 Sta 1+73.30 to Sta 2+30.00 was

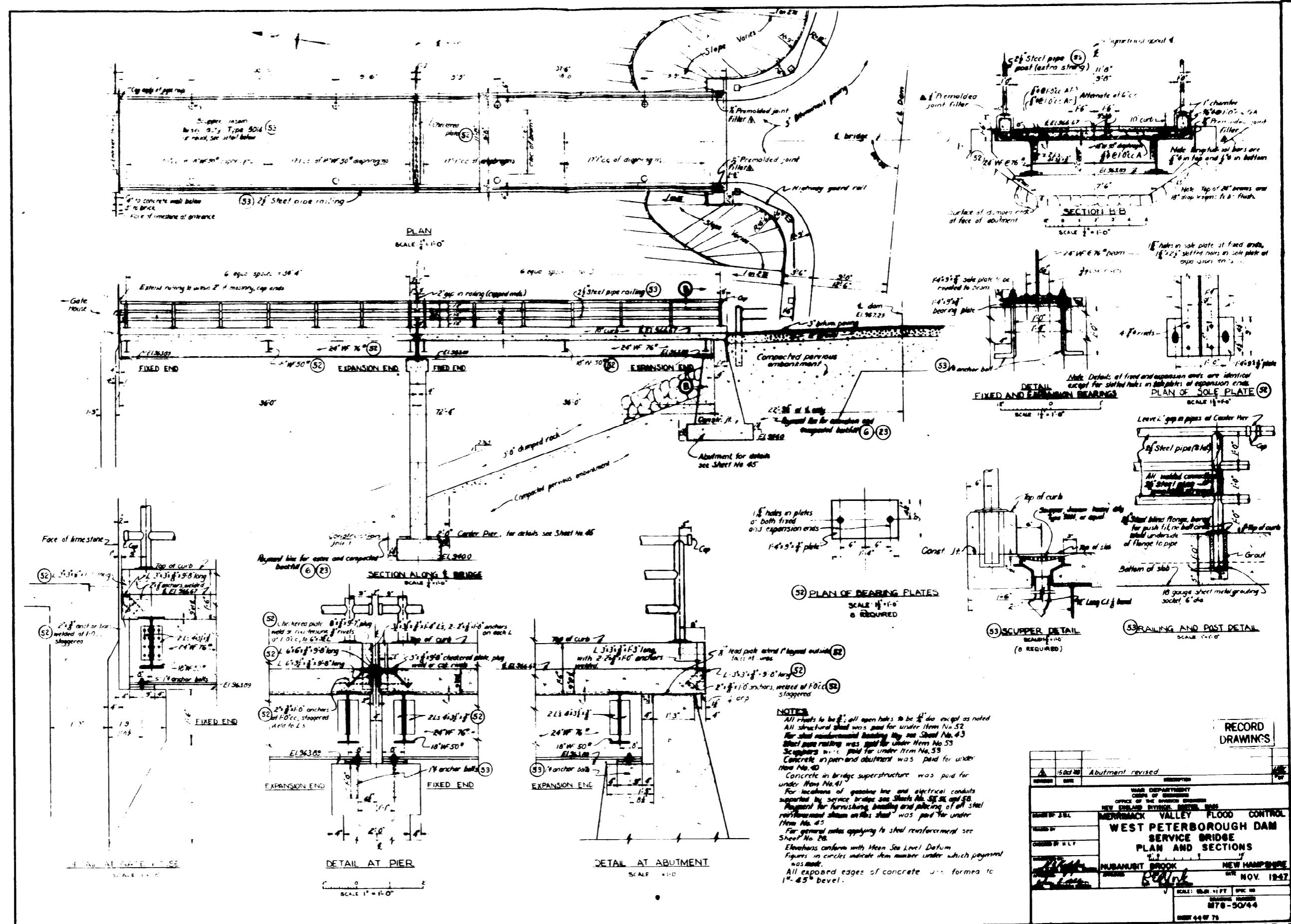
All concrete shown on this street above
El. 920.0 was paid for under Item No. 98

A		ERSON Dimension charged	PP
SEARCHED	INDEXED	SERIALIZED	FILED
<p style="text-align: center;">U.S. DEPARTMENT OF AGRICULTURE CIVILIAN ENGINEERING OFFICE OF THE CHIEF ENGINEER WATER SUPPLY AND POWER DIVISION</p> <p style="text-align: center;">MERRIMACK VALLEY FLOOD CONTROL WEST PETERBOROUGH DAM INTAKE STRUCTURE CONCRETE DETAILS NO. 2</p> <p style="text-align: center;">MURANUSIT BROOK NEW HAMPSHIRE</p> <p style="text-align: right;">NOV. 1947</p>			
<p style="text-align: center;">SEARCHED INDEXED SERIALIZED FILED</p> <p style="text-align: center;">JAN 1948</p>		<p style="text-align: center;">SCALE 1/4 IN. = 1 FT DPC NO. 10 DRAWING NUMBER MTS-50-87 PRINTED BY TS</p>	



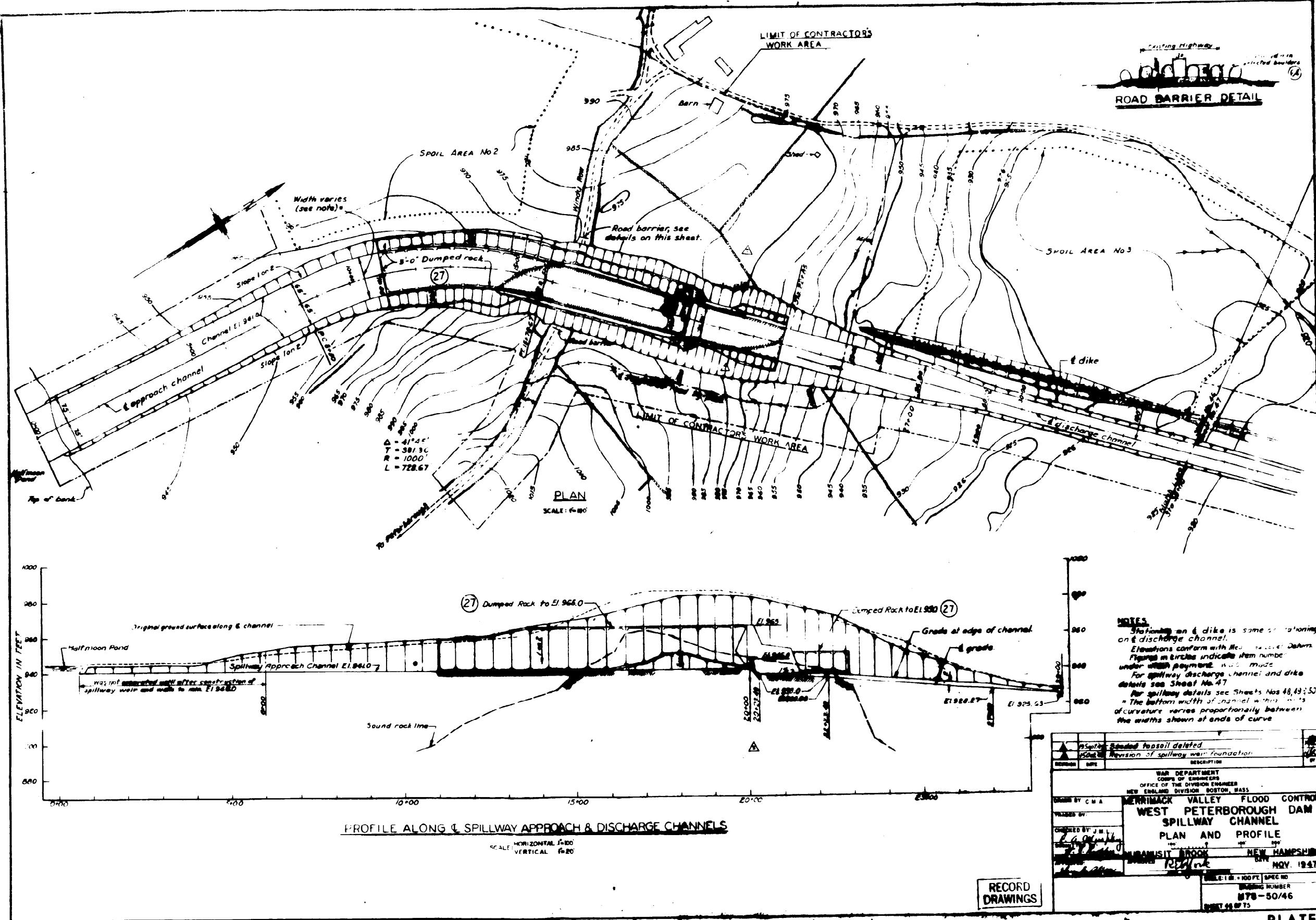


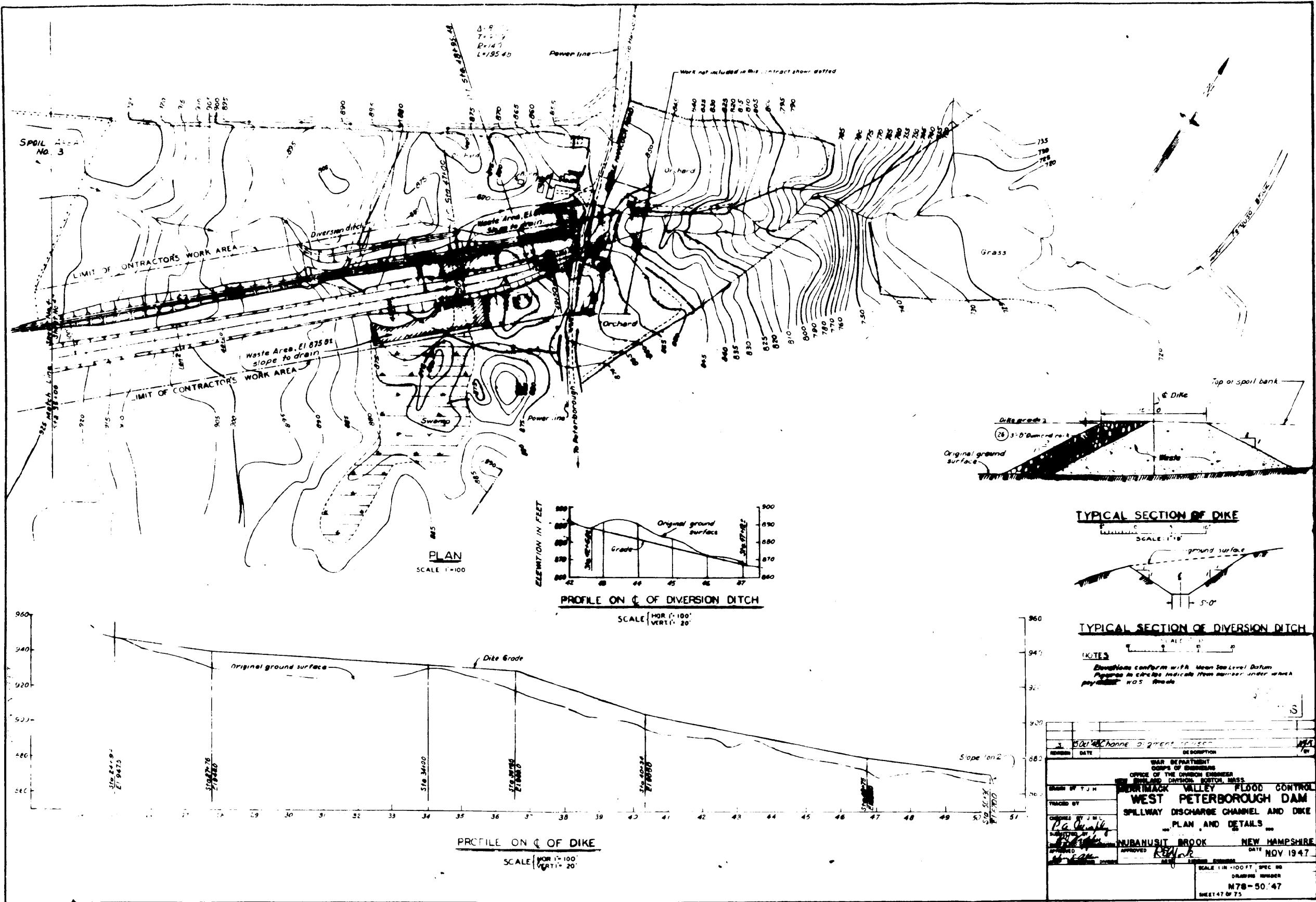


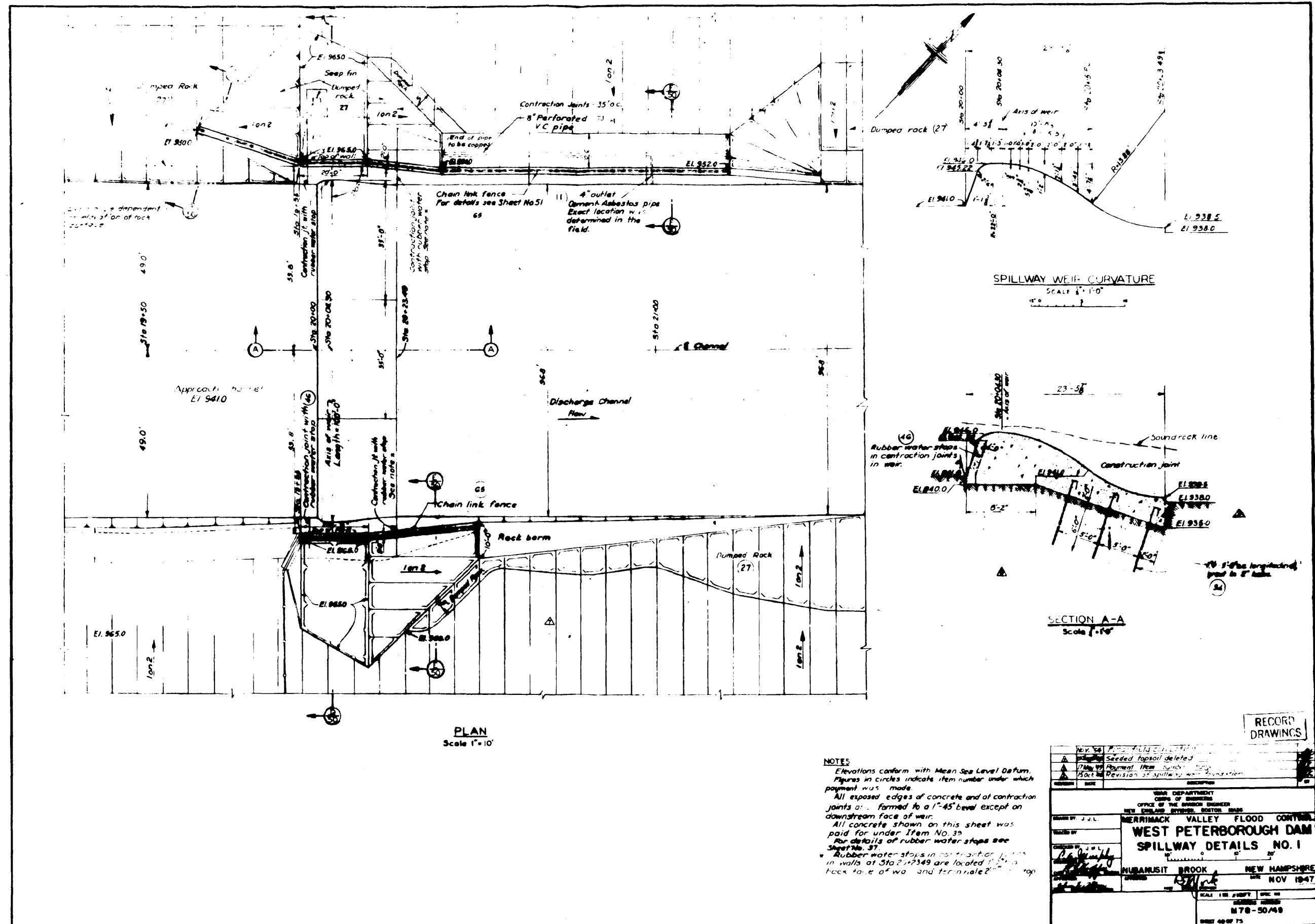


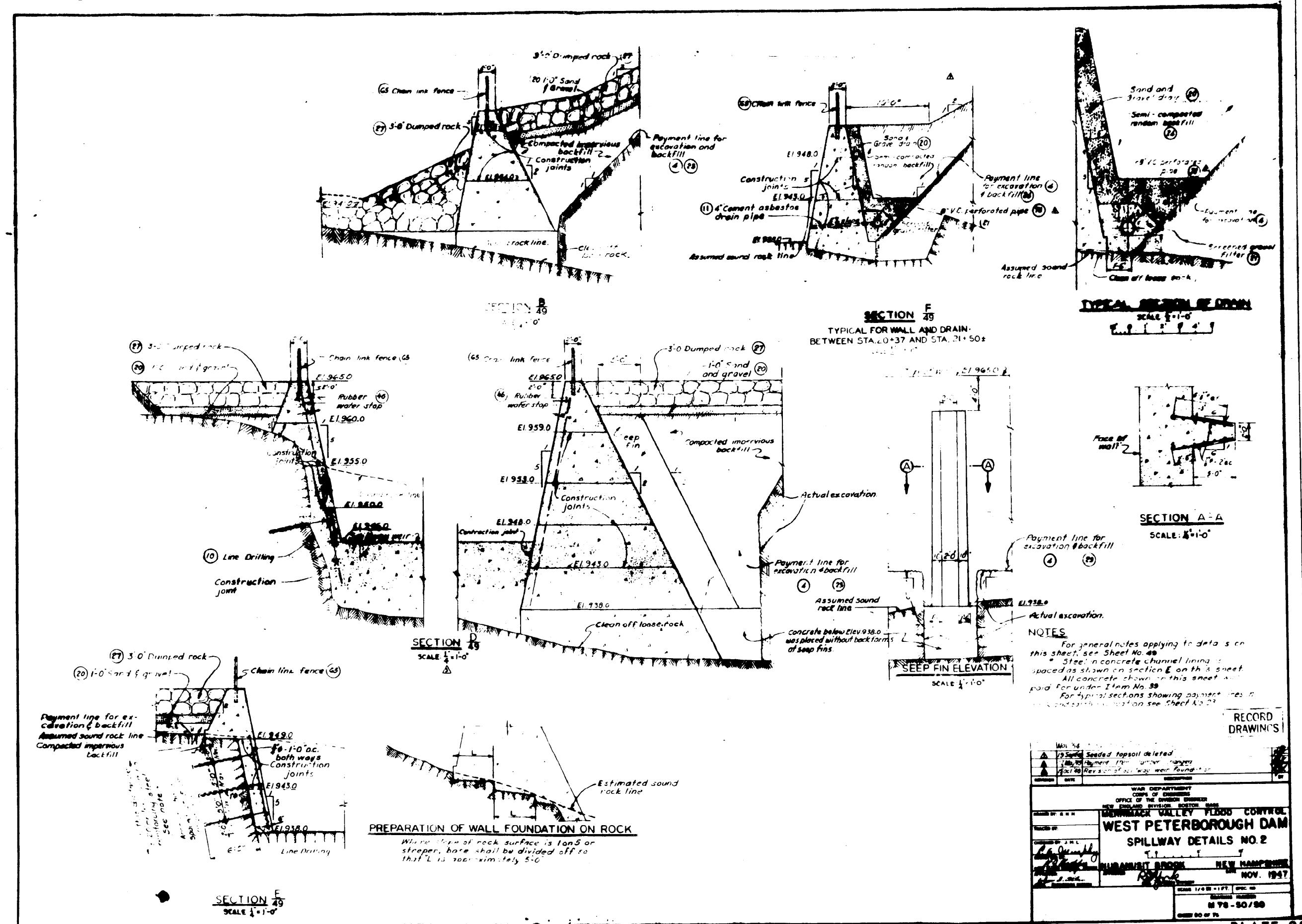
**RECORD
DRAWINGS**

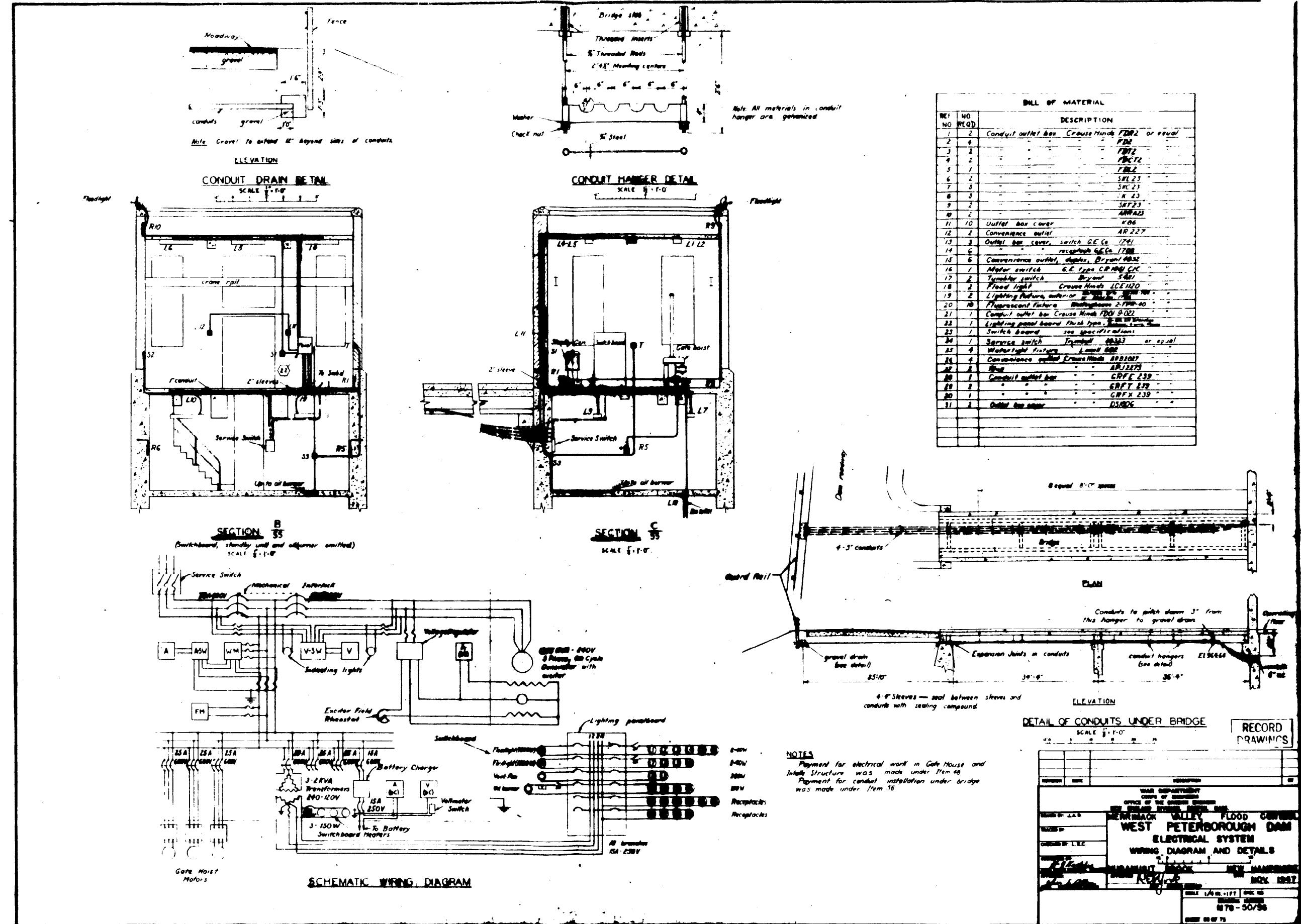
A		15 Oct 48	Abutment revised	REVISION
OWNER	NAME			
WAR DEPARTMENT CORPS OF ENGINEERS OFFICE OF THE ENGINER COMMANDER NEW ENGLAND DIVISION, BOSTON, MASS.				
DRAWN BY: JBL		MERRIMACK VALLEY FLOOD CONTROL WEST PETERBOROUGH DAM SERVICE BRIDGE PLAN AND SECTIONS		
TELEGRAPHED BY:		NUBANJUNT BROOK		
CHECKED BY: HLF		NEW HAMPSHIRE		
APPROVED BY: [Signature]		REFILED NOV. 1948		
SUPERVISOR: [Signature]		NOV. 1948		
DRAWN BY: [Signature]		SCALE: 1/250,000		
DESIGNED BY: [Signature]		SPEC. NO.		
APPROVED BY: [Signature]		DRAWING NUMBER		
RECORDED BY: [Signature]		MTR-50/44		
APPROVED FOR CONSTRUCTION BY: [Signature]		DATE: 44-75		

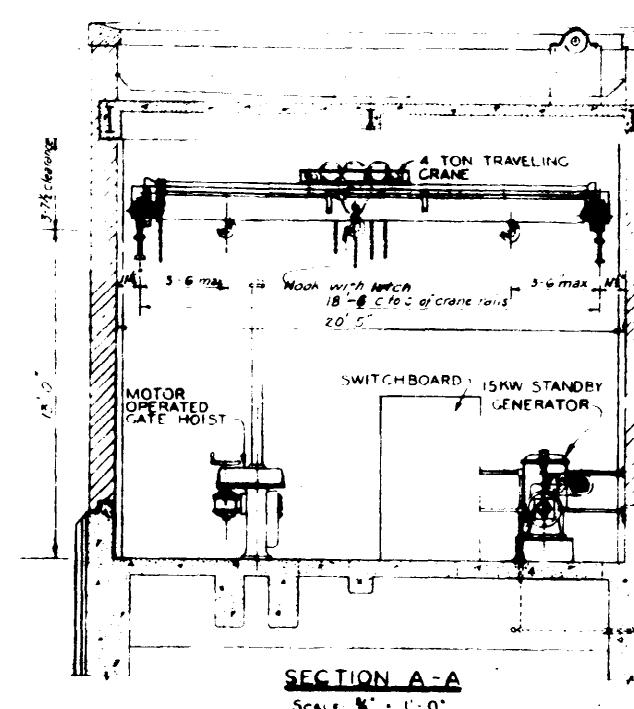






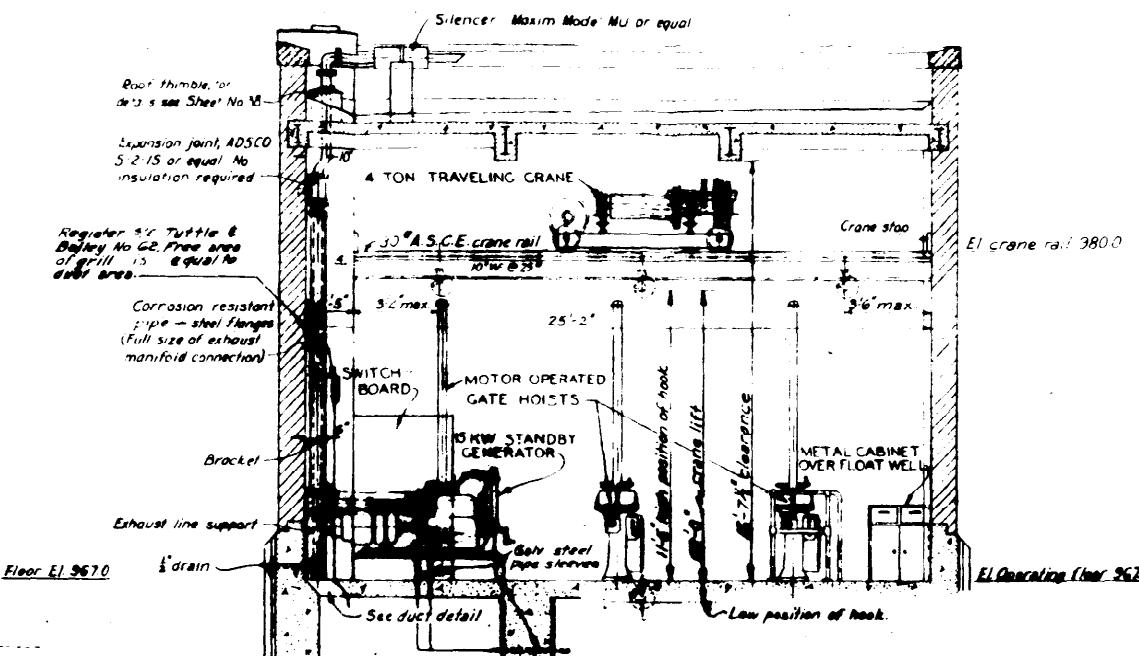






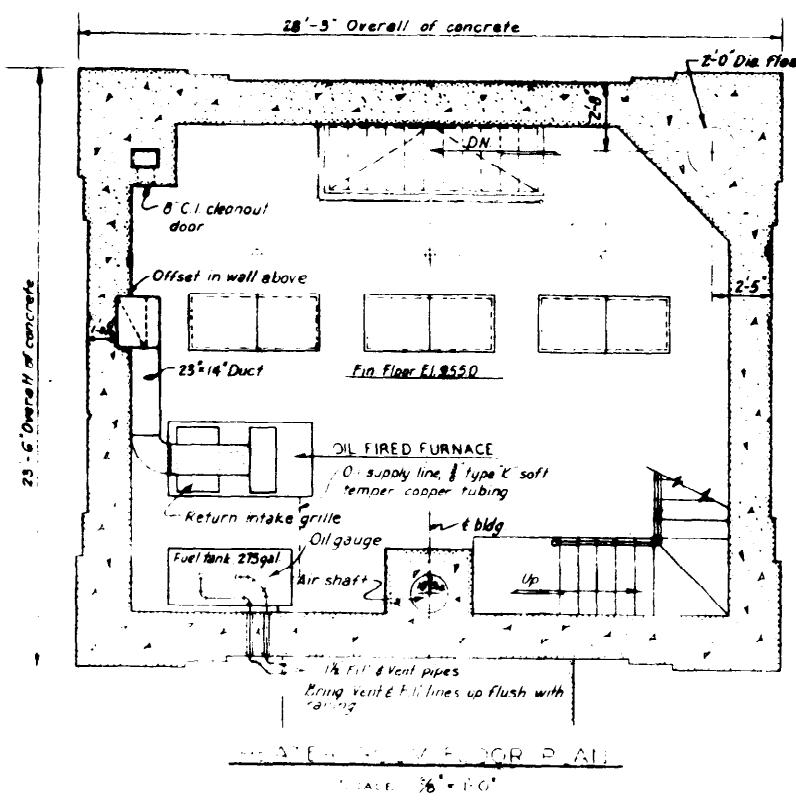
SECTION A -

SCALE: X -



SECTION B -

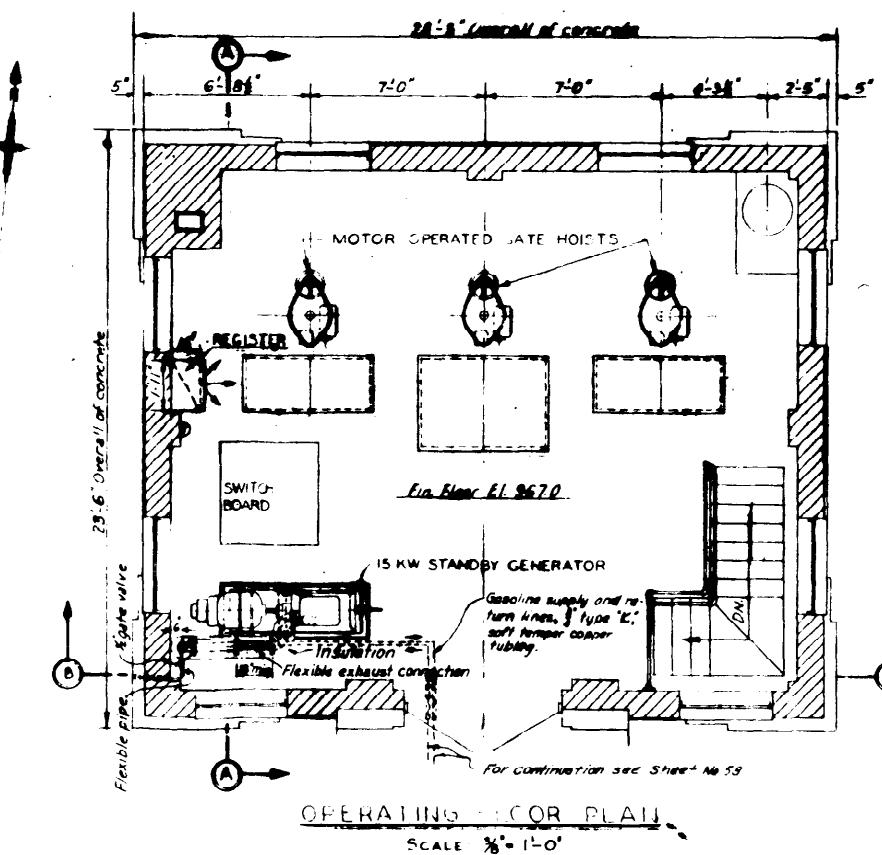
34



MANNHEIM - 62

28'-5" Overall of concrete

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OPERATING COR PLATE
SCALE $\frac{1}{8}$ " = 1'-0"

SCALE % = 1

NOTES

**Heater capacity, 125,000 BTU/hr at burner min
1,500 CFM at 10 SPM**

The heating system, including heater, oil burner, automatic controls, fuel oil tank, fuel oil lines, oil ge, etc., will be furnished and installed by a contractor and are included in contract.

Traveling crane was furnished and installed complete under this contract and was paid for by the U.S. Government.

*Gasoline electric generator set, gasoline
ank and piping, silencer and exhaust piping
was paid for under Item No 51*

